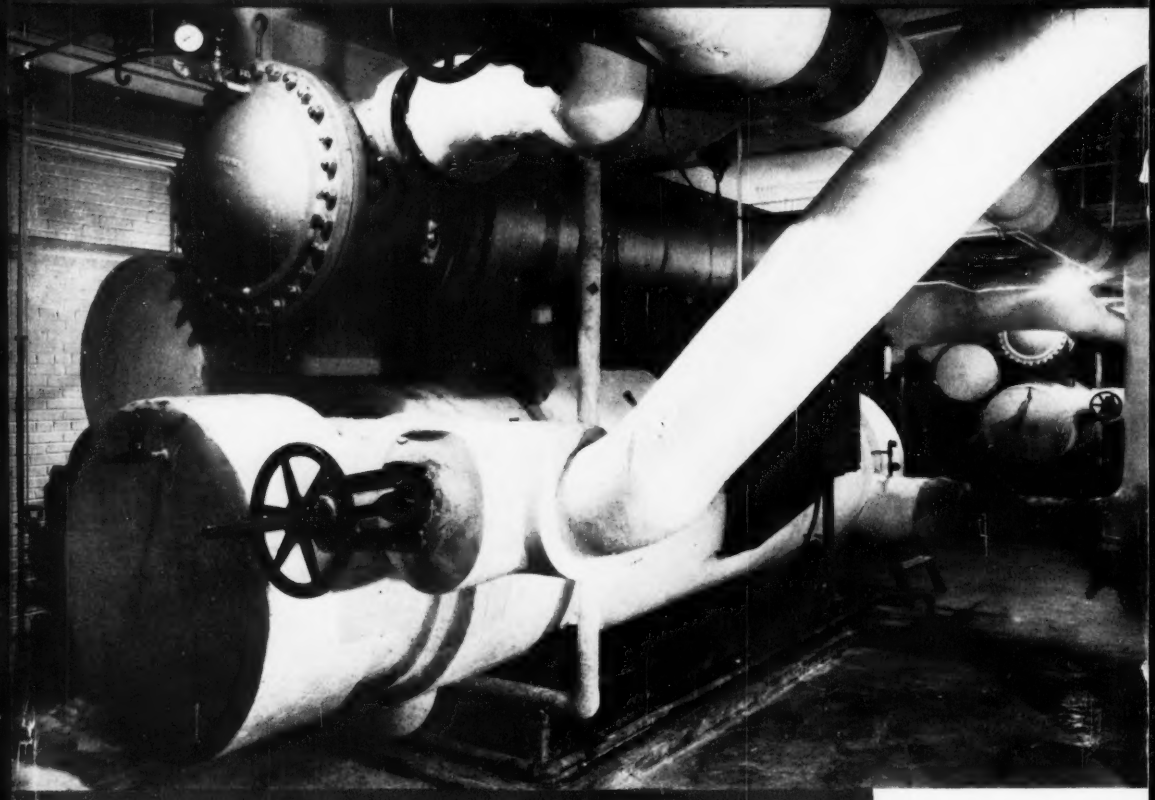
FOOD ENGINEERING

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

June 1952



CUSTOM-BUILT water cooler typifies engineering in Sunshine's new air-conditioned plant. Page 59

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Card Inside Back Cover

PUTTING IT ON THE LINE...

in Industry after Industry!

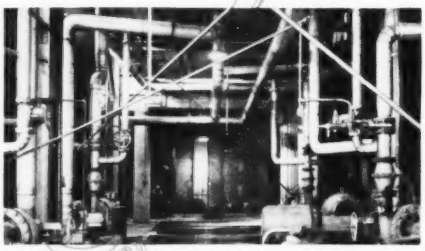
The Grinnell-Saunders Diaphragm Valve . . . . . .

Here's why . . . Piping in today's complex industrial plants is an exacting science involving the handling of highly corrosive fluids, gases, compressed air, beverages, foods and suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors. Under such conditions, the amazing adaptability of the Grinnell-Saunders Diaphragm Valve explains its acceptance by industry after industry.

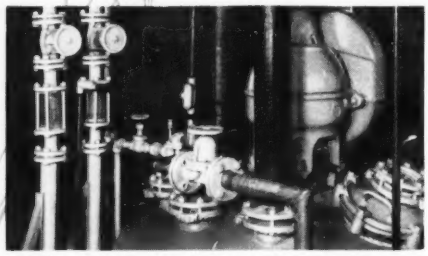
Bodies of this versatile valve are made in a variety of metals — iron, stainless steel, bronze, aluminum and others. *But of more importance* is the fact that a body of cast iron (a metal not in short supply) can be lined with glass, lead, natural rubber, neoprene and other materials which, in many instances, handle corrosive fluids *better* than metals.

Diaphragms come in natural rubber, neoprene, butyl, hycar, a special synthetic for foods, and KEL-F. This last is chemically inert to all acids and alkalies in all concentrations with the exception of molten alkali metals.

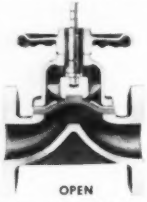
From this broad selection of materials, the problems which the Grinnell-Saunders valve can solve are extremely varied. No wonder industry after industry is putting it on the line.



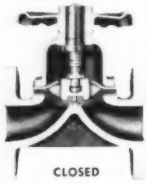
PULP AND PAPER MILL. Rubber-lined Grinnell-Saunders Valves on stainless steel piping handle sulphate pulp stock in bleach plant of Potlatch Forests, Inc., Lewiston, Idaho.



CHEMICAL PLANTS. Glass-lined Grinnell-Saunders Diaphragm Valves, with KEL-F diaphragms, handle chlorinated organic chemicals at Hooker Electrochemical Company, Niagara Falls, N. Y.



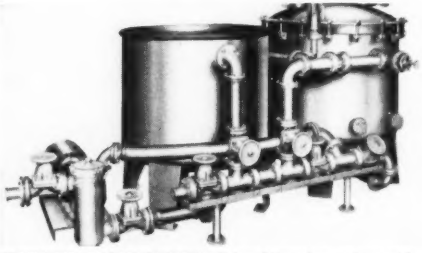
Showing rising spindle . . . valves are available with rising or stationary spindle.



KEL-F diaphragm, using special rubber backing cushion and floating tube nut design.

CHECK THESE GRINNELL-SAUNDERS FEATURES...

- Diaphragm absolutely isolates working parts from the fluid.
- Diaphragm lifts high for streamline flow in either direction.
- Diaphragm presses tight for positive closure.
- Body, lining and diaphragm materials to suit service.
- Simple maintenance — diaphragm easily replaced.



EQUIPMENT MANUFACTURERS. Grinnell-Saunders valves with rubber linings are standard on filtration equipment for solution clarification, made by Industrial Filter & Pump Mfg. Co., Chicago, Ill.

GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company Inc., Providence, Rhode Island • Sales Offices and Warehouses in Principal Cities

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

Food Engineering

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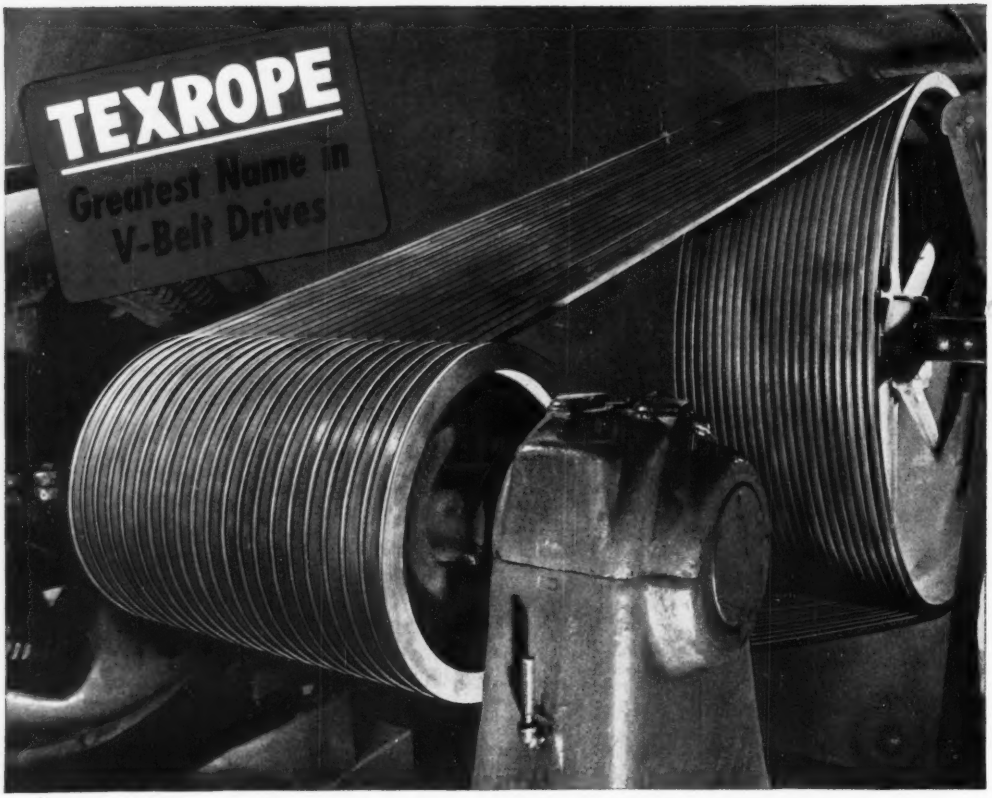

Check These 2 Ways to Cut Drive Costs

TEXROPE V-Belt Drives with low cost 1800 rpm motors will often do work of expensive motors and control.

For example you can:

1. Provide slow speed (such as 450 rpm) at the driven shaft using a standard 1800 rpm motor. A standard 4 to 1 *Texrope* drive will do it. And the savings over a 450 rpm cage motor, direct connected are:
   - 600 pounds weight (in 15 hp size).
   - About $200 in cost.
   - About 8% increase in efficiency.
2. Use *Vari-Pitch* sheaves on a *Texrope* drive and provide smooth, stepless speed adjustment. There's no need for a high cost special motor or electric control to provide up to 2 to 1 speed range.

For help on your drive problem, whatever it may be, call your nearby Allis-Chalmers distributor or district office, or write Allis-Chalmers, Milwaukee 1, Wis.
A-3735

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

Sold . . .
Applied . . .
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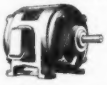
by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.



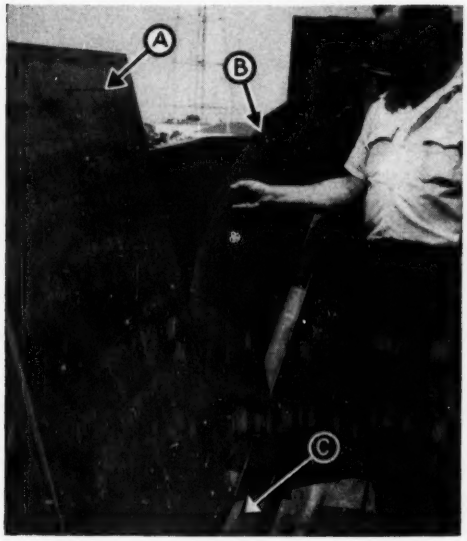
MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS

PRACTICAL IDEAS



We Cut Frozen-Food Transport Costs

At a fraction of the cost of new refrigerated trailers, we have improvised a small fleet of insulated carriers for our frozen foods.

What we did was convert our own 20-ton fresh-fruit trucks—in which the temperature rise has proved to be less than 1 deg. F. during a 1½ hr. trip in summer heat, in spite of the fact that there is no insulation on the bed of the truck. These units are for short haul.

We made the change without in any way altering the truck bodies, and we retained almost the same tonnage capacity.

This is how the conversion was made and the extent of the savings effected:

First, insulated panels—(A) in left photo—were fabricated by sandwiching 2 in. of Styrofoam between sheets of plywood. These were then double hinged to the bed, approximately 1 ft. from the side walls of the truck body. By double hinging the panels they can be swung against the sides of the truck (right photo), thus facilitating rapid loading by fork truck.

Panels can also be tilted against the cargo when the truck is loaded, minimizing the air space surrounding our cases of frozen concentrate.

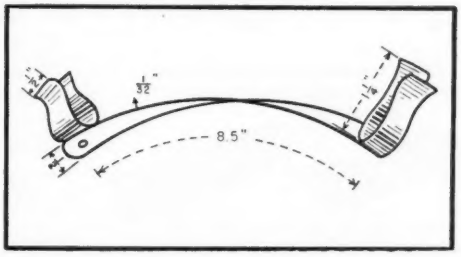
Next, canvas blankets (B) filled with 2 in. of Fiberglas are attached to the outside of the panels that line one side of the truck. Each blanket overlaps its neighbor, so that when blankets are pulled over the truck load of cases, the latter are thoroughly insulated above.

Swinging the hinged panels against the cargo and covering the cases with the blankets is a quick and easy task, due to the working space between the truck sides and the panels.

Since there is no interference from rear doors, pallet loading is simplified. Also, since no floor insulation is required, there are no deck strips or other obstructions on the bed to interfere with fork truck loading and unloading. There are, however, two angle-iron guide rails (C) anchored to the bed several inches inside the panels, to prevent damage to the latter or to cases of product.

Converted trucks are employed to transport frozen citrus concentrate from three of our own plants, and also from those of several co-packers, to our central zero-storage warehouse. Distances from plants to warehouse range 25-75 mi. Time in transit averages ½ to 1½ hr. Temperature rise of product on longest trip is less than 1 deg. F.

Since handling is rapid, due to fork-truck and pallet use, round trips for longest runs, including loading and unloading time, seldom require more than 2½ to 3 hr. Converted trucks provide an efficient time and labor saving method of short-haul transport for frozen-foods.—*Jack Van Horn, Industrial Engineer, Minute Maid Corp., Plymouth, Fla.*

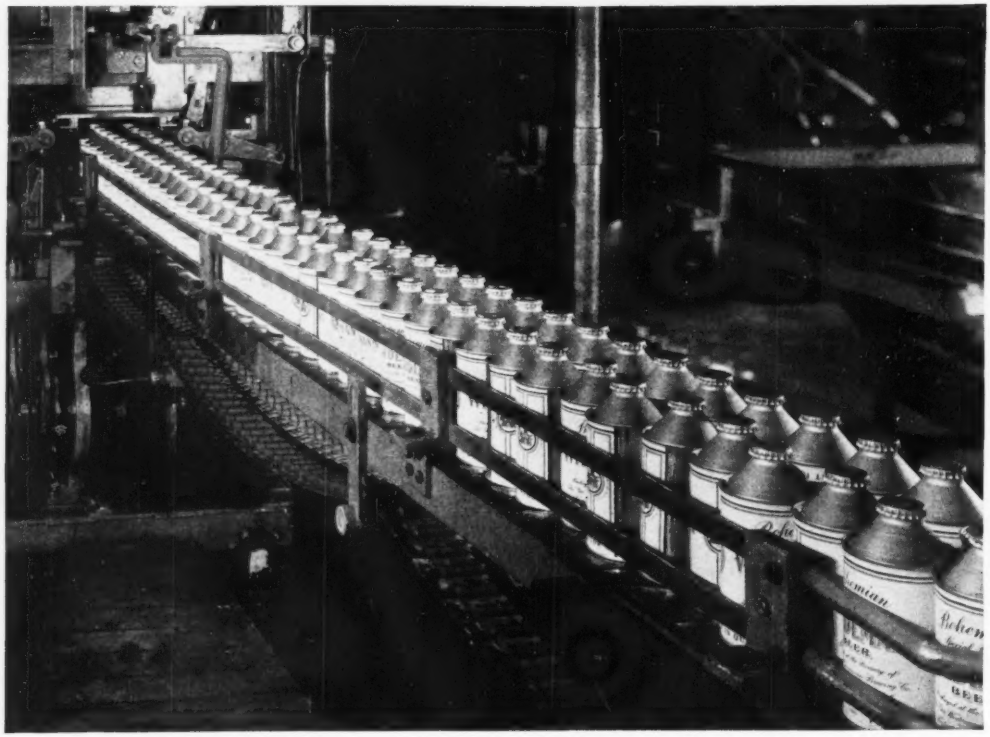


Clamps Avert Connecting-Bulb Breakage

We have designed a small, inexpensive device which has practically ended our breakage on Kjeldahl connecting bulbs.

When distilling flasks are removed from the Kjeldahl apparatus, the connecting bulbs have a tendency to swing back and forth. And if they hit the metal condenser at the back of the unit, they usually break. (*Turn page*)

no ONE chain serves every purpose



S-815 flat top chain carrying cans of beer at The George Wiedemann Brewing Company, Newport, Ky. This sturdy, economical medium is easily kept clean and assures a smooth ride for such products.

LINK-BELT offers the RIGHT chain for every job . . . engineered to meet your requirements

Typical conveyor chains from the complete Link-Belt line

Class RC crescent flat top chain—travels in horizontal planes, around corners; ideal for bottles and cans.

Class 400 swivel chain — carries cartons, cases, etc. over paths with both vertical and horizontal turns.

Class RC flat top chain — precision made for smoothest, spill-free carrying and long life.

Class RC universal crescent flat top chain can be used for multiplane operation traveling variety of paths.

Link-Belt offers no single "cure-all" chain to handle every job. From the most complete line of chains and sprockets—we can recommend the best type to fit your particular requirements—cast, combination, forged and fabricated steel, roller or silent. So, whatever your chain problems, large or small, Link-Belt engineers will work with you or your consultants to help solve them.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities.

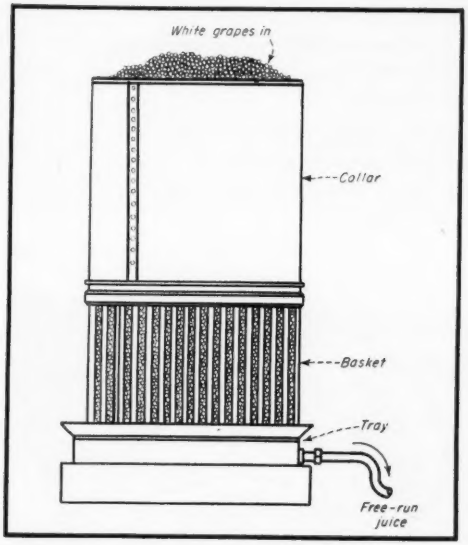
12,842-C

LINK-BELT

CHAINS AND SPROCKETS

Such damage can be reduced considerably by use of clamps mounted on a spring steel strip (see sketch). We attach them at each end of the rubber tubing that connects the condenser extension to the bulb.

The flexible steel strip measures 8¼ in. by ⅜ in. To each end is attached a clamp of the same material.—*Silvio Crespo, Laboratory, American Stores Bakeries, Philadelphia.*



Juice-From-Pulp Drainage Time Cut

By introducing in musk preparation a basket-collar type unit in which free-run juice can drain from crushed grapes, The Louis Martini Winery, St. Helena, Calif., has reduced drainage time and attendant labor.

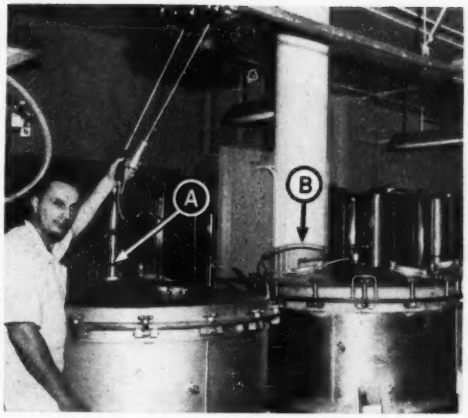
Two conventional methods are usually employed for separating free-run juice from crushed grapes in making premium quality California white wines. After crushing, grapes may be pumped to a false bottom tank where the juice drains through a screen or perforated plate on which pomace is retained.

Another method, frequently used, is to deliver crushed product to a fermenting tank where the pomace cap is allowed to rise, after which the free-run beneath the latter is pumped out of the tank.

In both cases drainage is time consuming—and the pomace must be shoveled out by hand, after which it is transferred to presses for recovery of second-quality press-juice.

This is how the improved equipment is constructed: A wooden basket (sketch) is fabricated to fit into a drain pan, and over it a metal collar is fitted. The two parts, basket and collar combined, have a capacity of 4 tons of crushed grapes.

Now, the mashed product is pumped into the new equipment for approximately a 5 hr. drain, during which time the pomace settles below the level of the collar. When the latter is removed, the basket of pomace is wheeled to the hydraulic press for juice extraction. The operation of shoveling out the containers is thus bypassed.—*FE Staff.*



Flexible Hose Aids Lid Removal

By replacing rigid pipe connections with flexible hose couplings we have not only reduced the labor required to remove lids for emptying and recharging percolators, but have also speeded operations and reduced maintenance requirements.

Our initial method of delivering solvent to a percolator was via a pipe—(A) in photo—feeding through the percolator lid. In order to remove the lid after each percolation, it was necessary to disconnect the feed pipe, then reconnect it after each charge of the vessel. This was an inconvenient, time-consuming operation.

However, by substituting flexible wire hose (B) of ample length, lids can be lifted sufficiently by hoist without having to dismantle the solvent pipe line.—*D B. Bradshaw, Plant Engineer, A. H. Johnson Co., Boston.*

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

APRIL PRACTICAL IDEA voted best was "Device Detects Over-Turned Cans," submitted by R. A. Riley, Florida Fruit Canners, Frostproof, Fla. Described was a method of intercepting and halting cans over-turned on a conveyor—a hooked arm engaging any toppled cans and thus sounding an alarm to summon an attendant.

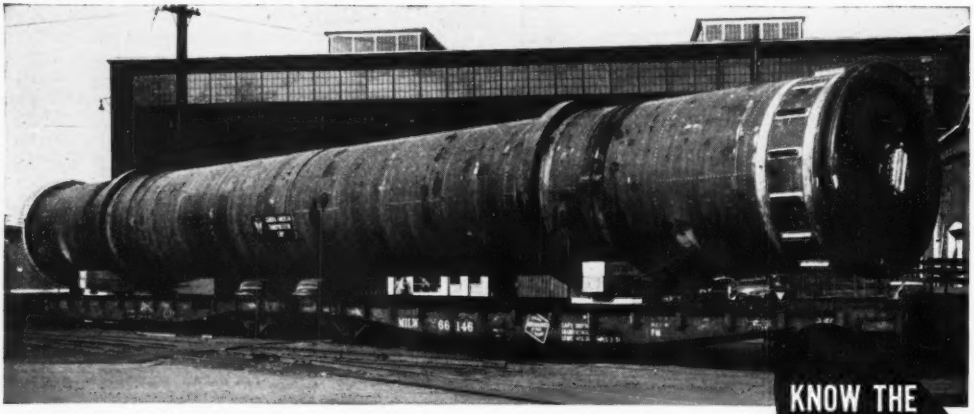
See Louisville for

CREATIVE DRYING ENGINEERING

Customer report on a Louisville Dryer . . .

"I would like to say that the Louisville Rotary Dryer which was recently manufactured by your plant at Sharon (Pa.) is in operation and that all reports from our engineers and operators indicate this to be the finest fabricating job in their memory.

"The outstanding quality on the fabricating jobs on these difficult pieces of equipment is certainly the finest type of advertising your company could have."



KNOW THE RESULTS before you buy!

This is it . . . the largest steam tube dryer ever built!

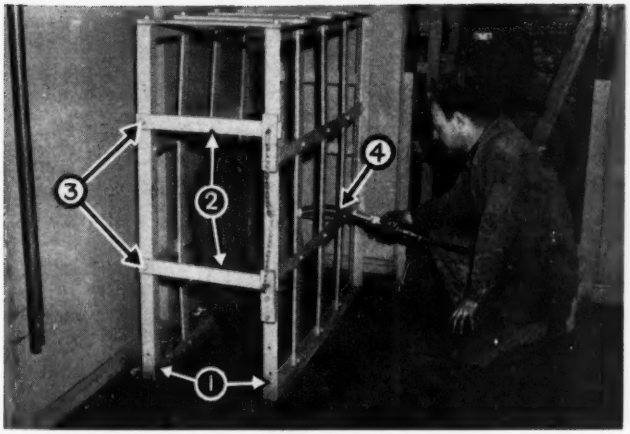
Its cylinder alone is 10′ in diameter by 100′ in length. It is one of four ordered by this customer . . . proof he believes in Louisville Dryers! Proof furthermore of his satisfaction with the performance for more than 20 years of his present Louisville Dryers.

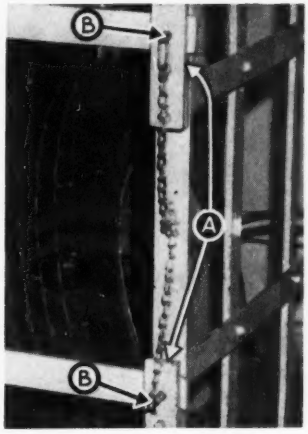
Write for new treatise on Rotary Dryers

Other General American Equipment:
Turbo-Mixers, Evaporators, Dewaterers, Towers, Tanks, Bins, Filters, Pressure Vessels

PROCESS EQUIPMENT DIVISION
GENERAL AMERICAN
TRADE MARK

Louisville Drying Machinery Unit
Over 50 years of creative drying engineering
GENERAL AMERICAN TRANSPORTATION CORPORATION
Dryer Sales Office: 139 So. Fourth St., Louisville 2, Ky.
General Offices: 135 So. La Salle St., Chicago 90, Ill.
Offices in all principal cities
In Canada: Canadian Locomotive Company, Ltd.
Kingston, Ontario





Cage Makes Tire Inflation Safe

A shielding structure, made of angle-iron and heavy steel straps, in which high-pressure tires are rolled for inflation, has made blowing them up in our garages a safe operation.

Formerly, inflating high pressure tires, mounted on a two-piece rim, one piece a locking ring, had too frequently been the cause of injuries.

Since using our safety cage, two tires, inflated to 100 lb. or more, have "blown" the locking rings with such force that the impact, against the heavy steel cage, bulged out the sides—yet the operators were in no way hurt.

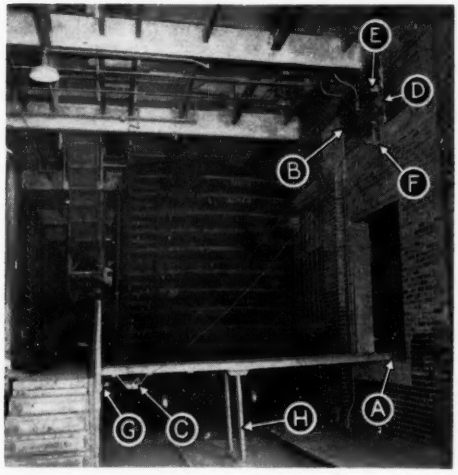
This is how the cage is constructed:

Frames of the two sides—(1) in left photo—are made of angle-iron to which cross members of $\frac{3}{8}$ in. x $1\frac{1}{4}$ in. steel strap are bolted. Across the top and at one end are placed other shorter cross-members.

A most important part of the cage construction is the front end, through which tires are rolled to be inflated. Here, the cross-members (2) are pivoted at (3), resting in slots—see closeup (A) in right photo—when lowered after tire is rolled inside.

These straps serve to prevent the sides from expanding at the entrance end in the event of an explosion. Therefore it is very necessary to make sure that the pins (B), which pass through the two sides of the slot and through a hole in the strap, (in order to anchor the straps to the frame), are always in place before inflation.

A good precaution is to use an extension on the air hose—(4) in left photo—so that when the hose is attached to the inner-tube valve-stem, the operator's hands are outside the cage. This makes it necessary that the air hose attachment at the valve be of lock-on type.—*William O'Niell, Assistant Superintendent, Abbotts Dairies, Inc., Philadelphia.*



Controls Assure Bridge Operation

We have installed inexpensive, but adequate, controls on a retractable runway bridge spanning a much-used railroad track between building and loading dock. And this has assured automatic raising and lowering of the platform without damage to the motor or other mechanism.

Used as a thoroughfare by heavily loaded trucks, the runway (photo) is hinged at (A) for raising clear of the right-of-way when cars are to be moved. Lifting is by means of a cable anchored at (B), passing around pulleys at (C), and over a single pulley at (D), thence to a reversible magnetic-clutch type motor.

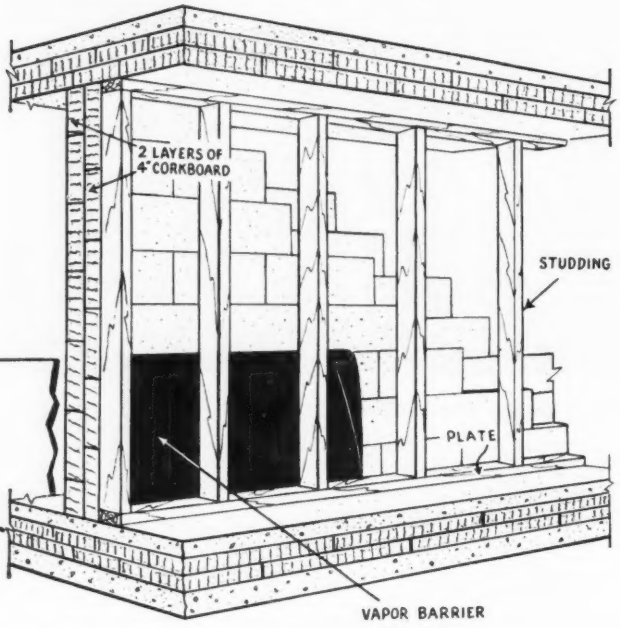
When the platform swings up to almost vertical, it operates a solenoid switch (E) which stops the motor (otherwise, cable, motor, or attachments would be damaged). At the same time, solenoid switch-operated latch (F) engages the runway to hold it secure in its raised position.

Motor starter, when pressed to lower the platform, disengages the latch to permit the runway to descend as the cable plays out. Were it not for the solenoid control (G), which the runway actuates at the end of its downward travel to stop the motor, the cable would continue to unwind from its spool, causing a tangled mess of cable as well as an accident hazard.

Hinged center supports (H) swing in against the runway when it is raised, giving ample clearance when cars are moved.—*F. A. Wenske, Assistant Superintendent, Plant Maintenance, Eastern States Farmers Exchange, Buffalo.*

We have been asked:

How can we temporarily partition off freezer storage space?



A food wholesaler wrote to us recently and outlined this problem: "We are planning to build a large new freezer, actually larger than our present requirements. Can we partition off this room so that we need refrigerate only part of it, until such time as we need all the space?"

To answer this question, we sent the following suggestion: To avoid the needless expense of maintaining unused refrigerated space, part of the cold room can be temporarily sealed off with a wall of Armstrong's Corkboard. Then, when additional business volume creates the need for more cold space, this temporary wall can be removed.

A typical construction method is shown here. The temporary partition is built of two 4" layers of Armstrong's Corkboard and supported by 2" x 4" studs on the warm side of the wall. The layers are put up dry, so that the corkboard can be taken down and used again. The first layer of corkboard is firmly nailed to the studs over a vapor barrier of roofing felt. The second layer is then secured to the first by means of wood skewers. The cork on the cold side of the partition can be left bare or finished with a thin brushed-on coat of asphalt emulsion if desired.

Next time you have a job which calls for insulation, consider the many advantages of Armstrong's Corkboard. This sturdy material offers maximum insulating efficiency – is quick and easy to install. It has exceptionally high moisture resistance . . . won't shrink, swell, or warp . . . is lightweight and fire resistant. Finishes bond securely to its surface.

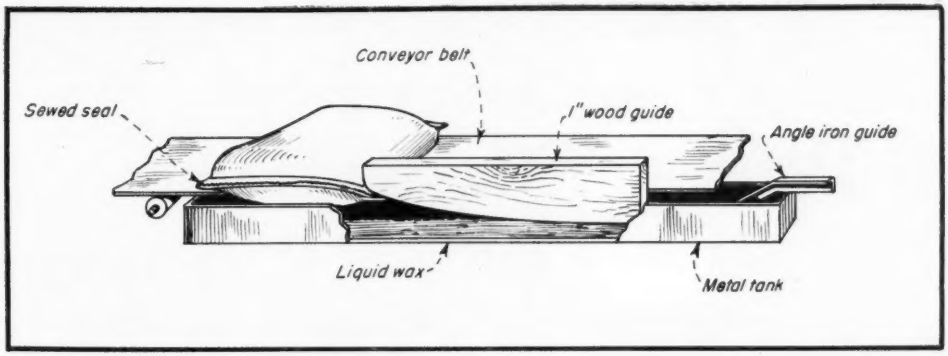
In addition to furnishing top-quality materials, Armstrong can plan and install the entire job for you—save you time, trouble, and money. For further information about Armstrong's **complete** Insulation Service, contact your near-by Armstrong representative.

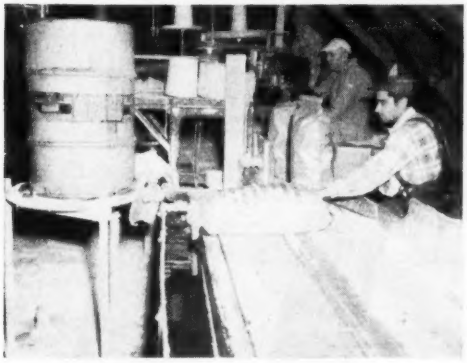
SEND US YOUR QUESTIONS: If you have any questions about insulating materials or their use in high- or low-temperature installations, please write us. We'll see that you get a prompt, practical answer. Just address your letter or post card to Armstrong Cork Company, 2306 Concord Street, Lancaster, Penna.

ARMSTRONG'S INDUSTRIAL INSULATIONS

MATERIALS - INSTALLATION

FOR ALL TEMPERATURES FROM 300°F. BELOW ZERO TO 2800°F.





Shop-Engineered Bag Sealer

By applying work-shop engineering, we have been able to reduce hand labor and at the same time speed our packaging of army-contract enriched flour. Thus we now meet government requirements 100 percent.

Packaging this product, which must be filled into special cotton-paper bags and sealed waterproof (so that the bag will actually float on water), involves a difficult sealing job. In order that both ends of the bag be completely moisture-proof, they must be thoroughly sealed with wax.

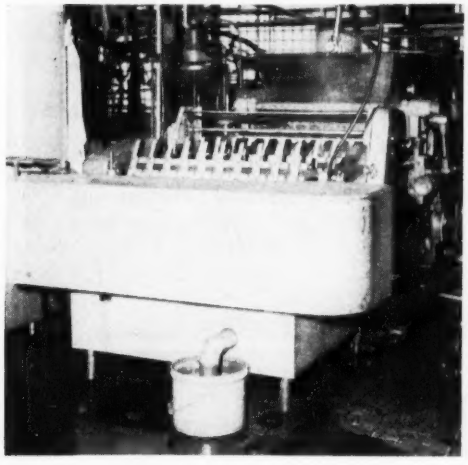
Formerly, this operation took the entire time of an operator brushing on wax from a melting pot, a procedure wasteful of both material and time. In fact, the perfection necessary to meet requirements made this operation the slowest in our plant.

To convert this wax-job to a production line operation, we rigged up a steel drum with an electric emersion heater, adding a thermostat control to keep a day's supply of wax at a few degrees above melting point. The drum was placed by the side of the belt conveyor transporting bags from the stitcher.

We then erected a metal trough beside the conveyor to carry a supply of molten wax from a spigot-nozzle at the base of the heating drum.

To effect application of the wax to the stitched closure, a board was suspended above the trough, so shaped that as a bag comes along the conveyor, the board forces its stitched lip beneath the level of the wax. A steel angle-iron rail, attached inside, then guides the bag top out of the trough.

Thus, our bottleneck has been eliminated, and every bag is now meeting the water-tight specifications.—*G. S. D. Smith, General Milling Superintendent, Flour Mills of America, Kansas City, Mo.*



Water in Pail Solves Dust Problem

By piping blower exhaust from our jar-cleaning machine, so as to discharge over a few inches of water in a bucket, we have saved the labor of erecting a long duct to exhaust outside the building.

Furthermore, since the considerable volume of dust and lint collected is not discharged into the atmosphere, it cannot re-enter the plant, nor become a nuisance to our neighbors.

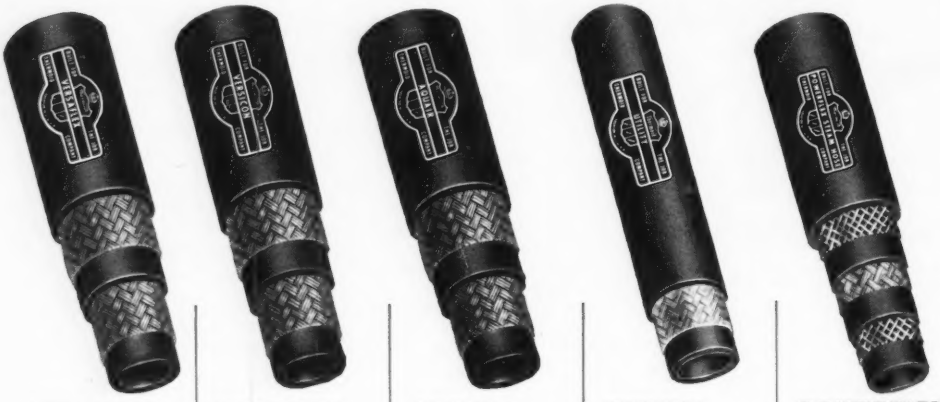
The bucket (see photo) is located under a projection of the cleaning machine—much less complicated then having a duct extending up from the unit for overhead travel to the building wall.

From the standpoint of efficiency, it is important that the level of the liquid in the pail be maintained slightly below the level of the exhaust outlet. In this way there will be complete removal of foreign material from the air without splattering of the water.

Sediment collects in the bottom of the bucket at a rapid rate, hence must be removed periodically to provide ample depth of dust-absorbing liquid.—*F. T. Ogle, Plant Engineer, American Preserves, Philadelphia.*

now! 5 basic types of Thermoid hose do the work of eighteen!

The new Thermoid line of molded hose cuts handling time and storage costs 70% or more in a wide variety of industrial and commercial uses! Thermoid's "Basic Five": Versaflex . . . Versicon . . . Aquair . . . Utility . . . Powerflex . . . now combine simplification and versatility with Thermoid top quality construction. And Thermoid's new standard color identification eliminates confusion in storage and stock selection!



VERSAFLEX
Multi-purpose hose built to withstand higher pressures. Recommended for butane, propane, insecticides, etc. Color code: *Red*.

VERSICON
A true all-purpose hose for virtually every type of air, gas or liquid. Color code: *Brown*.

AQUAIR
Rugged, dependable hose for handling air, water, welding gases. Color code: *Green**.

UTILITY
Most practical hose for air, water and illuminating gases at pressures from 75 to 125 psi. Color code: *Black*.

POWERFLEX
Designed specifically for super heated steam at pressures from 100 to 200 psi. Color code: *Black*.

You can definitely simplify your buying, inventory, storage and stock selection with Thermoid's color-coded "Basic Five". Get full information from your distributor or write direct for Hose Catalog No. 3680. It's yours for the asking.

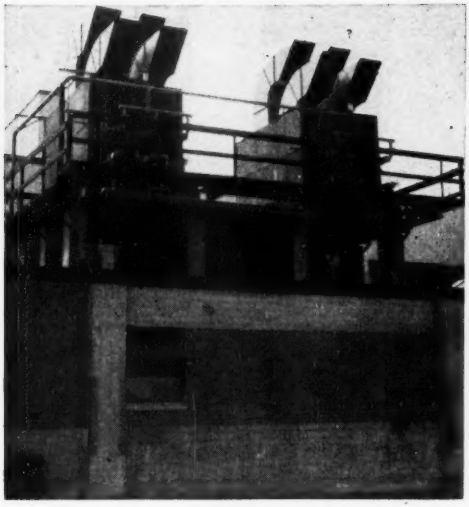
**Also furnished with Red Cover for acetylene*

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



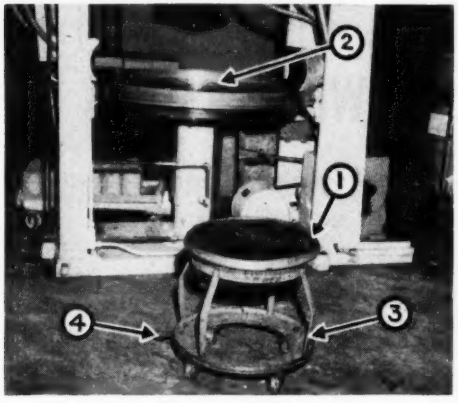
Ends Rusting on Exposed Condensers

Today, four years after we first applied automobile-fender undercoating to our evaporative condensers, there is nowhere any evidence of rust.

Our condensers are on the roof, exposed to the weather. So rust had us battling all the time. Repeatedly, we tried different type coatings as soon as the previous covering proved inadequate. It was "no go."

But then we thought of fender undercoating—and won our fight against the rust. And not only on the roof condensers, but also on coolers in our cold storage and freezer rooms, as well as on sundry piping, tanks, and other iron surfaces.

True, this type surface may not be pretty to look at—but it certainly prevents rust.—*H. F. Davis, Plant Engineer, Danahy-Waxon Stores, Inc., Buffalo.*



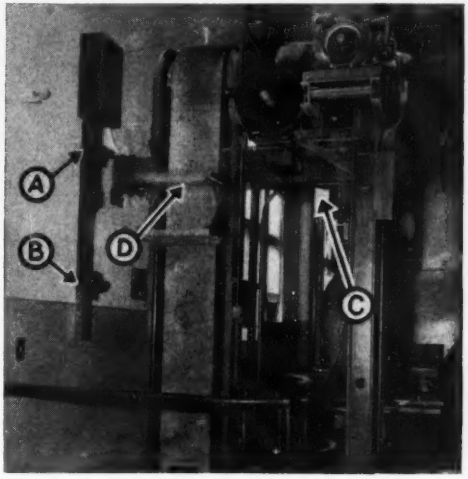
Truck Protects Hard-Candy Bowls

A simply made frame on casters is now used for transporting batch-measuring bowls of hard-candy base to the kneeding machine at S. F. Whitman & Sons, Inc. This has speeded the operation and lengthened the life of the bowls.

Formerly, the candy base from the vacuum kettles was emptied into measuring containers—(1) in photo—which were then transported by hand to the mixing machine (2), where color and flavor are incorporated.

Now the bowls are cradled in the castered mobile unit (3), which is pulled by means of a detachable hook-end bar inserted in a hole in a metal strip (4) welded to the carriage frame.

Besides speeding operations and protecting the bowls, the units also avoid operator fatigue caused by low stooping and hand carrying.—*FE Staff.*



Electric-Eye Man-Lift Control

A double, angled-beam, electric-eye control, designed at our plant and installed on our man-lifts, has proved infallible for instantly stopping the elevator if the rider fails to safely step off at the top floor level.

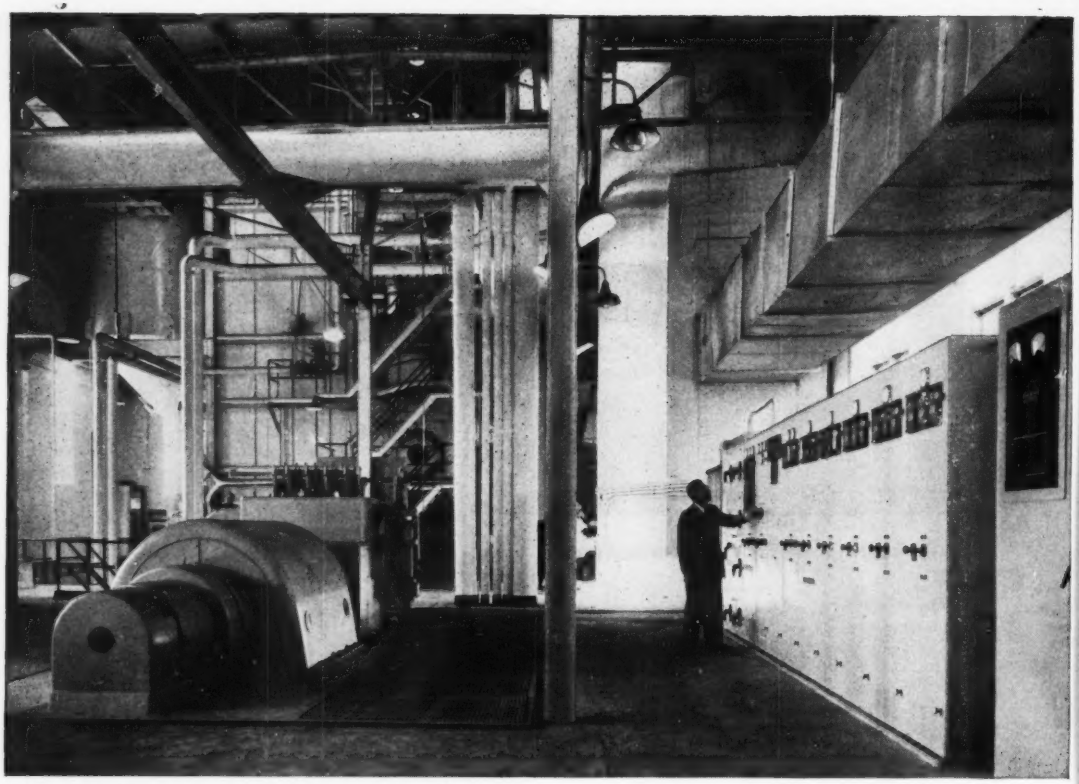
Though man-lifts have many advantages when installed in multi-storied buildings, they are inherently an accident hazard. Certainly, if a rider fails to dismount at the top floor level, he will be hurled into the air ten feet or more above the floor, since here the belt rounds the top pulley. Since installing our electric control, this type accident is no longer possible.

This is how the electronic apparatus is rigged up and how it functions.

Beams from a pair of electric-eyes—(A) & (B) in photo—are directed at an angle to a single receiving control (C).

At the location where the rider platforms (D) travel, the space between the beams is several inches more than the depth of the platform. Since the control assembly is so wired that both beams must be interrupted at the same time to stop the elevator's travel, empty platforms do not interfere with lift movement. However, a man's head and shoulders, or even a hat resting on a lift-platform, will interrupt both beams and bring the elevator to an immediate halt.

Once the controls have stopped the lift, it cannot be re-started except from the main switch, which is specifically located so others may give the man who has over-ridden plenty of time to dismount before a re-start.—*J. George Kehr, Superintendent, Russell-Miller Milling Co., Buffalo.*



Great Western's power-house equipment comprises G-E turbine-generator set, G-E metal-clad switchgear, and new boiler (rear). G-E turbine specialists worked in close co-operation with the boiler manufacturer to assure ample power and process steam with maximum economy. Switchgear units control power distribution at 4160 volts to five G-E load-center unit substations throughout the plant.

Great Western improves plant efficiency with modern G-E power system

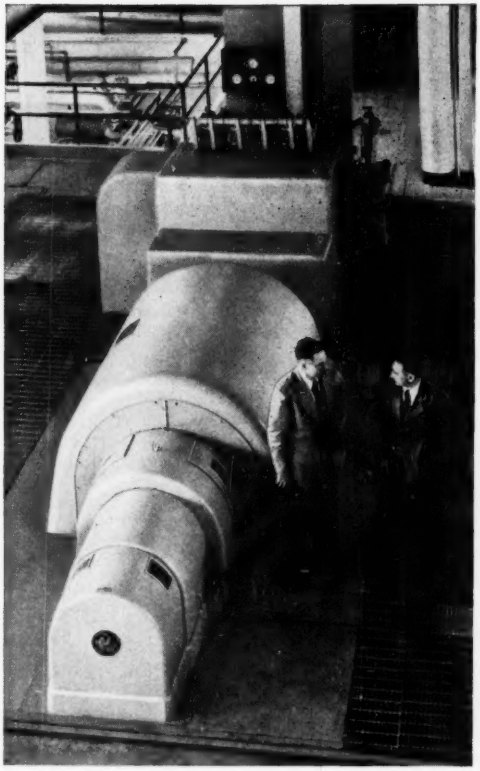
Complete modernization program undertaken at Longmont plant to meet expanding needs for power and process steam

Continuing its company-wide modernization program, Great Western Sugar Company recently completed the first step at its Longmont, Colorado plant: modernization of the plant power station. To fill increased process steam requirements and to furnish high-voltage power for more efficient distribution, a new General Electric high-pressure turbine-generator set was installed, along with two modern boilers.

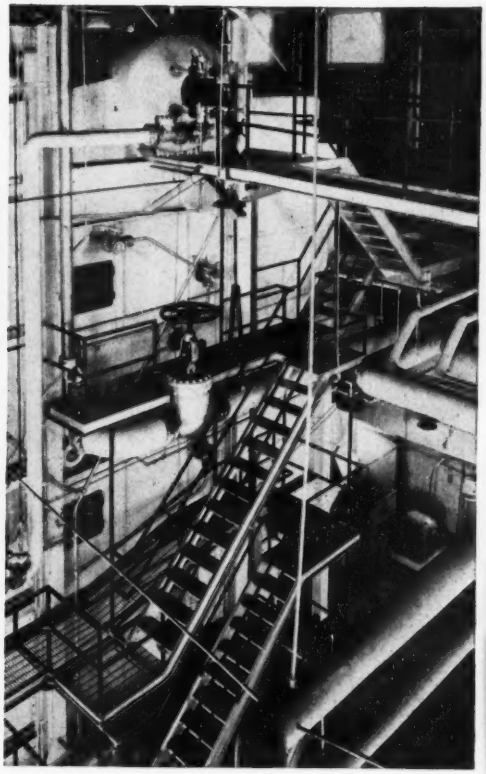
Modernization can increase the efficiency of *your* food plant the same way, and G-E system engineering will be an important aid. Call in your G-E food industry specialist—early in your planning. *General Electric Company, Schenectady 5, N. Y.*

New G-E Motor Course

The new G-E Motor Selection and Application Course, a "More Power to America" program, can give your workers more motor "know-how" in 9 easy-to-take lessons. For details, send for Bulletin GEA-4938-16.

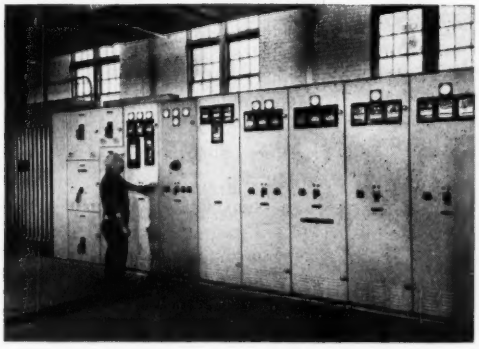


Power for entire plant is supplied economically by this 3500-kw G-E turbine-generator set. This unit utilizes steam with high efficiency—provides closer heat-balance control.

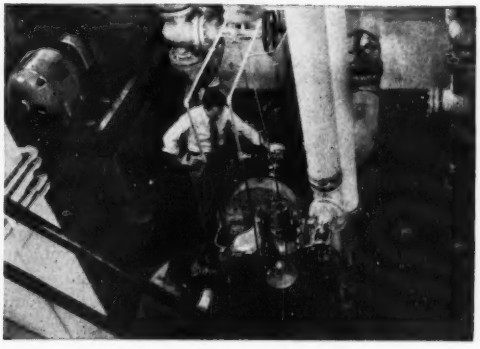


New 150,000 lb. steam boiler is one of two replacing ten formerly used. At lower right, driving the boiler draft fan, is a G-E 200 hp Tri-Clad* motor, triply protected against operating wear and tear.

*Reg. Trade-mark of General Electric Company.



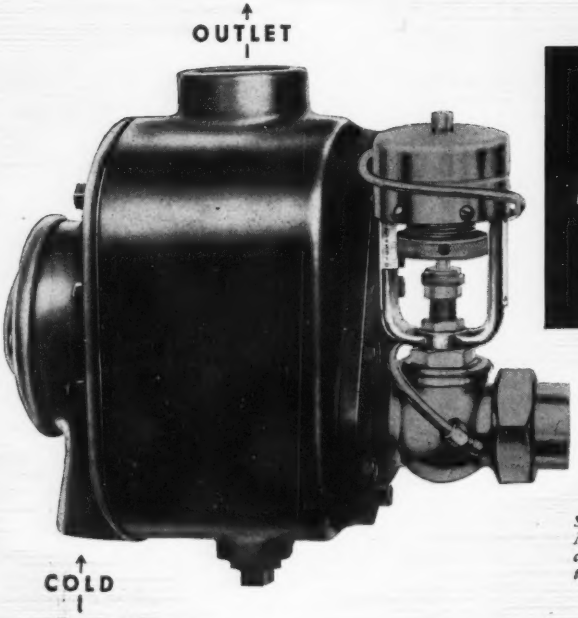
Factory-assembled G-E switchgear, rated 150 MVA, was shipped as a co-ordinated unit for easy, low-cost installation. The equipment is metal-enclosed for personnel protection and low maintenance.



Low-cost, mechanical power is provided by this G-E mechanical-drive turbine driving main boiler-feed pump. Hydraulic governing provides wide adjustable speed range. Standardized replacement parts keep inventory costs low.

GENERAL ELECTRIC

652-11



AUTOMATIC MIXER TAMES HOT WATER

Sylphon Hot-Cold Water Mixer No. 902. Sizes with capacities ranging from 5 to 131 gallons per minute.

Keeps Process Temperature Constant!

THIS SYLPHON Hot-Cold Water Mixer can "take over" the job of supplying constant temperature process water—relieve you of all worries! It's one of the best helps for bakeries . . . dairies . . . packing houses . . . candy factories and other operations where water temperature must be maintained *accurately*. Ideal also for gang showers, wash fountains, etc.

See how simply and dependably this Sylphon Mixer works. It uses hot water from any storage tank or instantaneous heater. It regulates the amount of cold water required to temper it to the desired degree. It actually mixes water together before delivery. And even if the supply water temperature or pressure fluctuates—temperature remains constant.

And think of this extra advantage! If either hot or cold water supply fails, the Sylphon Mixer immediately shuts off the remaining supply. When supply is returned, the Mixer starts operating again.

Sylphon Hot-Cold Water Mixers are self-contained, self-powered, compact and ruggedly built. Serve economically for years. Adjustable temperature range. For complete information, write Dept. LG.

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Temperature Controls • Bellows Devices • Bellows Assemblies

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DIVISION

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN.

Canadian Representatives, Darling Brothers, Montreal

Makers of BOSCO use B·W VORTEX COOLERS

For Highly Efficient, Completely Automatic Processing

Bosco Company, New York City, utilizes Barry-Wehmiller Vortex Coolers in the production of *Bosco*, nationally known chocolate-malt flavored syrup. Many other producers of fine foods and beverages, packed in glass or metal, also assure highly efficient operation by using Vortex machines for cooling, pasteurizing, exhausting or freezing.

The basic engineering advantages of the Vortex pay dividends to users regardless of the application to their particular product. The patented "walking beam" conveyor and atomized spray method of heat transfer provide unusual operating economies. The unique hydraulic drive eliminates many gears and cam movements; holds friction to a minimum. Power requirements are unusually low.

Operation is entirely automatic and accurate speed control at the turn of a dial assures the finest speed adjustments to proper processing time. The Vortex is designed and engineered for years of heavy-duty, trouble-free service in many types of applications.

Write for complete information, sending us your requirements, today.

THE SUN NEVER SETS ON B-W BOTTLE CLEANERS PASTEURIZERS & PROCESSORS

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IN GREAT BRITAIN B-W WEHMILLER MACHINERY CO. LTD. BOURNE HOUSE, MITCHAM JUNCTION, SURREY, ENGLAND

BW-280

For more information, use post card on last page.

HE'S NEVER EATEN BETTER

Whether it's between the slices of a sandwich or in the form of a juicy T-bone, the meat that today's citizen eats is the finest that has ever been available—thanks to over a half century of advances in packing techniques and practices.

It was 54 years ago when Worthington made one of the first refrigerating installations in the meat packing industry. Our first customer was one of the leaders —Armour (then E. F. Dudley Co.).

A year later, in 1898, a large Worthington System was installed for the Boston Packing and Provision Company.

But this was just the beginning. Since the turn of the century, Worthington constantly worked to build better and more efficient refrigeration equipment to meet the increasing needs of America's packers.

Today, in an industry that to a large extent built its progress on the advances in refrigeration, the Worthington name serves such giants as Armour, Swift, Wilson, Hormel, Morrell, Union Stock Yards and Transit Co., Miller and Hart.

Worthington will continue to serve the packers with the most complete line of refrigeration machinery. We want to be sure users of refrigeration equipment everywhere never forget *there's more worth in Worthington.* Worthington Corporation, formerly Worthington Pump and Machinery Corporation. Air Conditioning and Refrigeration Division, Harrison, N. J.

America's Leader's... in Many Businesses... Select

WORTHINGTON

A-170

AIR CONDITIONING AND REFRIGERATION

The Most Complete Line... Always the Correct Recommendation

A completely new and different type of

Wetting Agent-Detergent

NYTRON

TRADE-MARK REG. U. S. PAT. OFF.

FOR FOOD PLANT CLEANING

In HOT or COLD, HARD or SOFT WATER, NYTRON cleans thoroughly . . . rinses completely without leaving a sticky residue or deposit.

Equipment Cleaning

Fruit and Vegetable Washing

Floor and Wall Cleaning

NYTRON Improves Cleaning Action of Alkalies and Acids.

USE NYTRON WITH CAUSTIC

for Fruit Peeling
Bottle Washing
Other Special Cleaning Jobs

USE NYTRON WITH ACID

for Tile Cleaning
Removing Milkstone
Removing Lime Scale
Other Special Cleaning Jobs

A SOLVAY PRODUCT

It lowers the cost of your cleaning operations because less is required to do a thorough cleaning job! *It increases efficiency* because it combines powerful cleaning action with dependable safety! Here are the details of what NYTRON can do for you . . .

. . . NYTRON cleans walls, floors and painted surfaces without removing paint, without affecting tinned or plated surfaces. It washes tile and glassware without streaking; it completely removes oils, fats and greases. NYTRON rinses thoroughly and quickly—even in cold water—leaving no film or deposit to harbor bacteria. It works equally well in hard or soft water . . . leaves no cloudiness, no spots even in the hardest water. And NYTRON is safe, mild and non-toxic—will not affect normal skin!

Samples of NYTRON

—as well as detailed information and technical data on its uses in the food industry—are available on request. Get all the facts . . . see for yourself how NYTRON can help your business operate more efficiently, more profitably. Mail the coupon today.

SOLVAY SALES DIVISION, Allied Chemical & Dye Corporation
40 Rector St., New York 6, N. Y.

I want to know more about NYTRON, the entirely new type (patented) WETTING AGENT-DETERGENT, and its uses in the food field. Please send me free samples plus detailed non-technical information and specific technical data.

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58 separate "Freon" installations

PROVIDE REFRIGERATION FOR HUGE PRODUCE TERMINAL

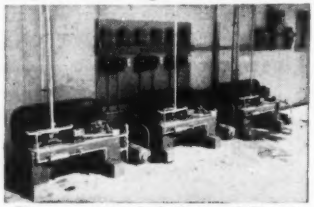
The versatility of compact refrigerating equipment charged with "Freon" refrigerants is readily apparent in this new $2,000,000 San Antonio Market.

The huge, 27-acre market place has 12 concrete buildings covering 8 acres of ground. Planned, built, owned and operated by farmers, truckers and produce men, the structure serves tropical fruit growers and citrus orchards and vegetable farms in the Texas Rio Grande Valley.

Pre-fabricated storage coolers and holding rooms for fruits and vegetables total 140,838 cu. ft. Refrigerating conditions vary from 68°F. to -20°F., with humidity held at 50%. Individual cooperating produce firms handled their own refrigerating contracts, although equipment is similar throughout the terminal, and it operates as an integrated unit.

Typical installations include 39 condensing units of from 3 to 7½ hp. with 12 forced-air cooling units for the low sides in various compartments. Sixteen condensing units with a total of 63 hp. serve storage rooms. Another installation has 3 condensing units with a 15-ton cooling tower. Banana holding and ripening rooms process tropical fruit regardless of its stage of ripeness.

An administration building; a restaurant with seating capacity of 250; a barber shop and shower facilities are completely air conditioned for personnel comfort. All equipment, except pre-fabricated coolers, was furnished by the United Refrigeration Company and was installed by four major contracting concerns situated in San Antonio.



Three compressors in the battery of "Freon" units serving the San Antonio Market.

An important advantage in using compact, versatile, low-cost equipment charged with "Freon" is that these refrigerants are entirely safe . . . noncombustible, nonexplosive, virtually nontoxic . . . harmless to foods, fabrics and finishes. In addition, the chemical purity of "Freon" refrigerants contributes to the economical, trouble-free operation of the machines and prolongs their useful life. "Freon" refrigerants also meet all building-code requirements. That is why air conditioning and refrigerating contractors and engineers unhesitatingly recommend installation of "Freon"-charged equipment. It meets every need throughout the entire food industry. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

KINETIC

"FREON" *safe refrigerants*

DU PONT

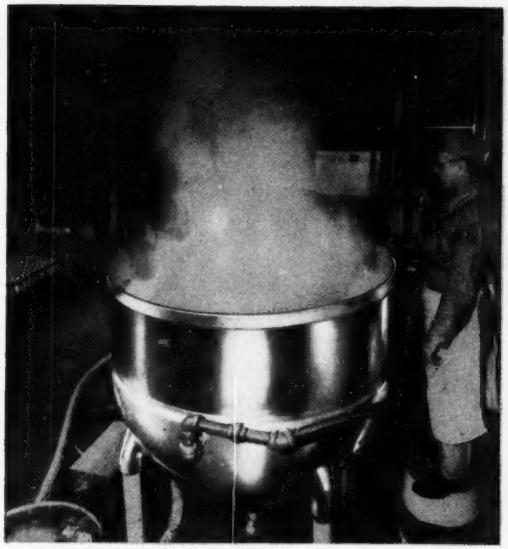
"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

When equipment must handle a variety of products, you can't beat easy-to-clean STAINLESS STEEL

——says this Chicago food firm



This Stainless Steel Groen steam-jacketed kettle operates on an intermittent schedule in processing preserves, jellies, dessert powders and sauces in B. A. Railton's Manufacturing Dept.

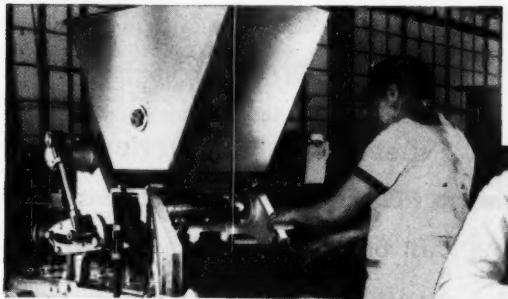
● Smaller processing plants, where equipment is called upon to handle products so varied that there are seldom two identical batches in succession, have found a simple solution to the problem of contamination by carryover. A liberal use of Stainless Steel equipment provides the answer.

Typical is the experience of B. A. Railton Company, one of the largest strictly institutional wholesale grocery firms in Chicago. Its Manufacturing Department processes and packs a line of pickles, preserves, jellies, sauces, spices, marmalades and mayonnaise for its institutional trade.

Stainless equipment here includes two 350-gallon steam-jacketed kettles; a filler with Stainless hopper, valves and measuring cyclinder, and vacuum-type bottle filler with Stainless filler heads and conveyor chain.

Leo Hass, Superintendent of Railton's Manufacturing Department, points out that, with Stainless equipment, a change of run requires little more than hosing down with boiling water. The dense, hard surface of Stainless Steel will not pit, consequently there are no cavities to make elimination of carryover more difficult. Fruit acids do not contaminate Stainless, and, highly important, Stainless lasts four or five times as long as other equipment.

No matter what food products you process, these benefits of Stainless Steel are important. And to obtain finest performance from your Stainless equipment, be sure that your fabricator uses service-tested U·S·S Stainless Steel.



The hopper, valves and measuring cylinders of this Geyer filler are Stainless Steel.

Inspecting the first run of dessert powder from the Groen kettle are John D. Senne (left), Vice President of B. A. Railton, and Leo Hass, Superintendent of the Manufacturing Dept.

UNITED STATES STEEL COMPANY, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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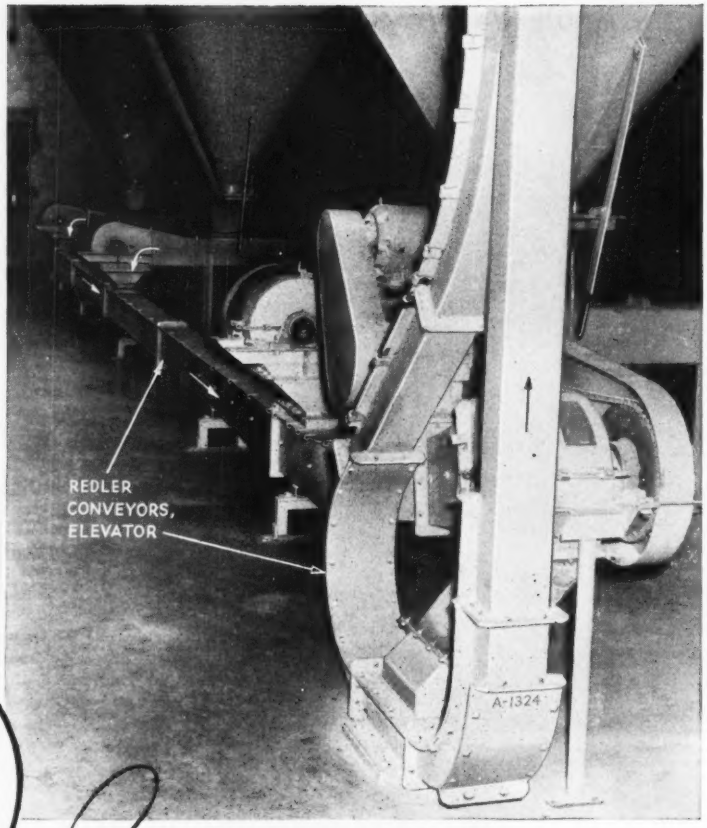
USS

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

2-295

UNITED STATES STEEL

Completely mechanical grain storage and reclaim system consisting of ten REDLER Conveyors and Elevators. Three horizontal REDLERS are shown drawing grains from storage and delivering to cross conveyor. Grains are lifted to a scale hopper several floors above.



Vibrating Conveyors
Belt Conveyors
Screw Conveyors
Bucket Elevators
Pan Conveyors
Vibrating Screens
Bin Gates, All Types
REDLER Conveyor-Elevators

S-A

ZIPPER Conveyor-Elevators
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Write for bulletins on any of the above

CONVEYING *Systems* speed Food Products Handling!

in compact REDLER Conveyors and Elevators

without Dust or Contamination

This particular problem was to design and install a handling system for moving grain speedily—without dust or contamination and in minimum space. S-A engineers came up with the right answer—and the right equipment!

But this is only one of hundreds of S-A installations, all designed to meet specific requirements. From coast-to-coast, S-A specialized experience, dating back for more than half a century, but in tune with today and tomorrow, is helping in the solution of bulk material handling problems.

If *you* have a materials handling problem, we will be pleased to consult with you. Just write—we'll send complete information.

STEPHEN S-A DAMSON MFG. CO.

6 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Your Margarine Deserves the Best...

Pfizer Pure Vitamin A*

• What greater factor is there in building your margarine sales than taste-appeal?

Because you have not spared cost or effort in arriving at the tops in taste, we believe your margarine deserves only the best in fortification... Pfizer pure Crystalline Vitamin A Acetate in Vegetable Oil. This product is odorless and tasteless. It will not impart any off-flavor or odor to the finished margarine.

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Pfizer Pure Crystalline Vitamin A Acetate in Vegetable Oil is highly stable by itself and in margarine. This can mean real savings since excessive overages will not be required.

It is uniform. Every shipment is subjected to rigid quality control to make sure it meets the high standards maintained by Pfizer for over one hundred years. Supplied in bulk or batch-size cans, Pfizer Vitamin A for margarine is packed for your individual requirements.

Pfizer is a dependable source. Year-in and year-out, your requirements will be met from the Pfizer plant at Groton, Conn.—one of the largest, most modern Vitamin A plants in the world.

We think you'll agree that your margarine deserves the product that offers all these advantages ...Pfizer Crystalline Vitamin A Acetate in Vegetable Oil. For further information, write to:

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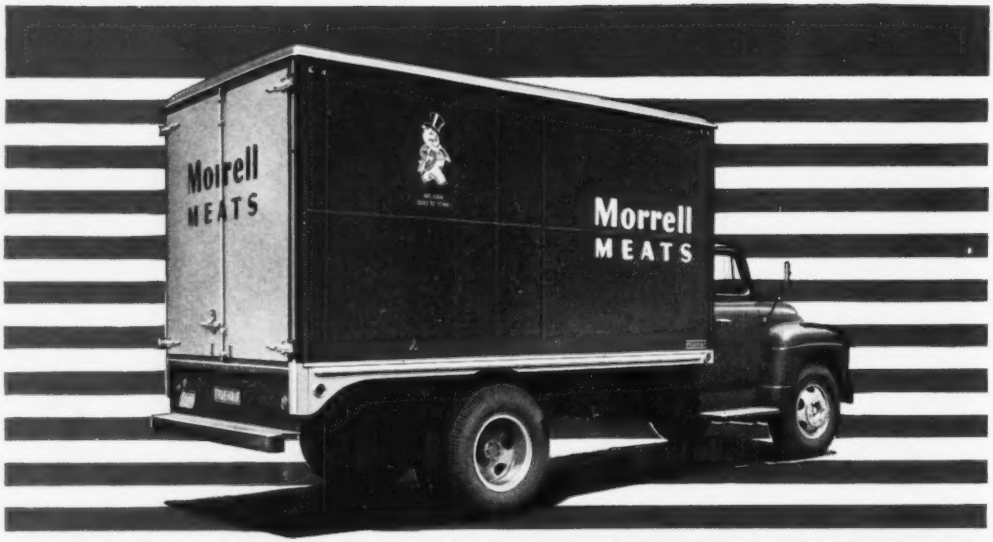
*Refer to Applicable FDA Standard of Identity

Pioneers and Leading Manufacturers of Vitamins

PFIZER QUALITY ® PFIZER



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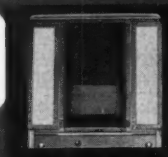
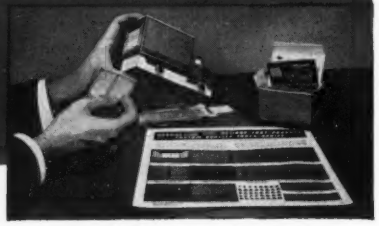
OVER 500 BODY COMBINATIONS!



Narrow Rear Doors

Full Rear Doors

Half Doors and Tailgate



ASK for Fruehauf's convenient Make-Up Model Kit. It's easy to assemble a miniature with exactly the features you want—*in a jiffy!*

And you'll also be glad to know the famous "Unit-Built" Body gives you all these extra advantages!

- ★ World's Finest Engineering!
- ★ Immediate Assembly!
- ★ All-Steel Frame and Body!
- ★ Custom Features at Standard Prices!
- ★ Convenient Fruehauf Service Everywhere!

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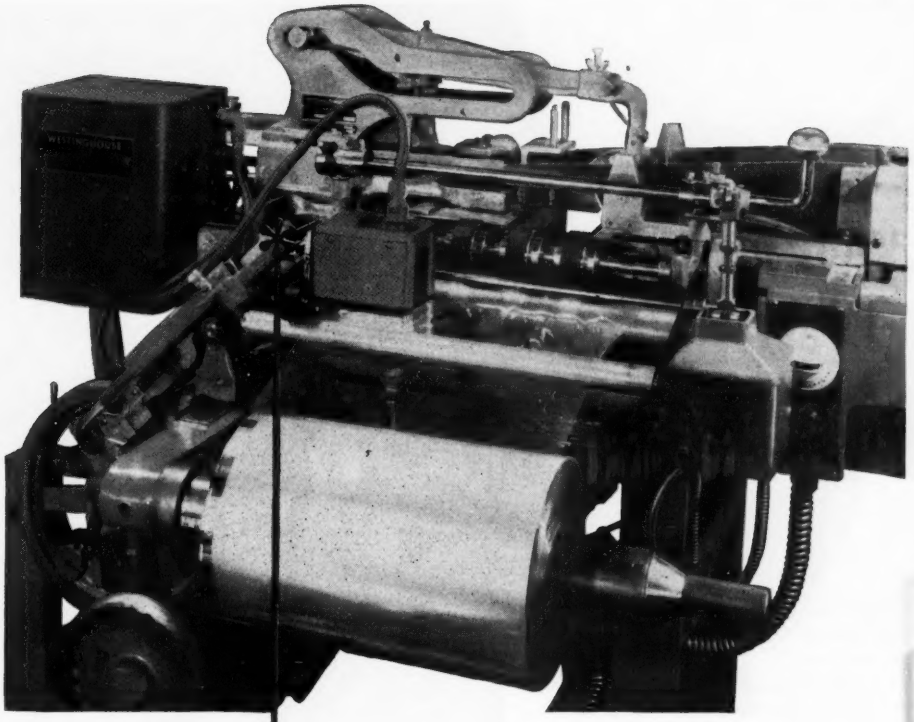
Truck Bodies



Here's one way to make your food machinery produce better . . . faster

Finding ways and means of helping Food Processors and Food Machinery Manufacturers to get better and faster production from their machines is one of the important jobs at Westinghouse.

Westinghouse and Hayssen Develop Drive—The drive for this Hayssen machine for packaging meats, vegetables and other products is a good example. Together, Westinghouse and the Hayssen Manufacturing Company's engineers worked out a drive that is perfectly matched to the needs of this machine.

Fast Production of Identical Packages—For instance, the electric eye "register regulator", shown above, scans the overwrap material as it is fed into the machine and "tells" the cutter bar exactly when to cut off a sheet. The entire wrapping operation itself is also completely automatic—the operator simply feeds the machine and stacks the packages. The result is fast production of identical packages with the printing always in the right position.

Call Westinghouse When You Buy—If you have a problem that involves drives for your food processing machines or any electrical requirements for your plant, call on Westinghouse. In addition to the right electrical equipment for the job, the priceless ingredient Westinghouse offers you is the skill of broadly experienced engineers in putting together the right combination of these devices. J-94923

YOU CAN BE SURE...IF IT'S
Westinghouse

EQUIPMENT FOR FOOD PROCESSING

What's corn doing up in the rafters?

Basic research in corn helped put it up there... in the form of fibre glass insulation.

Certain types of dextrines are needed to produce the glass fibre. These particular dextrines are developed by research in corn. Corn fills a myriad of industrial needs . . . our continuing basic research in corn serves all American industry . . . serves you.

Corn products in food

In the food field highest quality dextrose, regular and high-conversion corn syrups and superior starches are recommended ingredients for many processing formulas. New techniques involving the use of corn products are being developed as part of a continuing research program at Corn Products Refining Company.

If you have a production problem why not check with Corn Products? A complete line of corn products for every purpose is available. Technical service is yours . . . no obligation, of course.

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17 Battery Place, New York 4, N. Y.

Manufacturers of

CERELOSE® brand dextrose • **PURITOSE®** brand corn syrup • **GLOBE®** brand corn syrup

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Votator
HEAT-TRANSFER APPARATUS

Chills or slush-freezes in seconds!

● Here's how you can streamline packing operations with fast, continuous processing.

VOTATOR Heat-transfer Apparatus chills juices, purees, etc., or slush-freezes citrus concentrates in just a few seconds. Precise, automatic control saves time and reduces labor requirements.

With the closed-system process, variations are eliminated. Air is excluded . . . thus flavor, vitamin content, and purity are safeguarded.

Throughout the food processing field, VOTATOR Heat-transfer Apparatus is used for heating and cooling, sterilizing, plasticizing, emulsifying, crystallizing, quick-freezing and aerating. If you process any liquids or viscous materials, it will pay you to investigate . . . take advantage of Girdler's experience in process engineering, design and construction. VOTATOR—T.M. Reg. U. S. Pat. Off.

WIDE APPLICATION

FOOD PRODUCTS	FUNCTION OF VOTATOR APPARATUS
Cream Style Corn	Sterilizing and Cooling
Dog Food	Cooking, Sterilizing and Cooling
Chocolate Milk Drink	Sterilizing and Cooling
Edible Starch (For Salad Dressing)	Cooking and Cooling
Pie Filling	Cooking, Pasteurizing and Cooling
Strained Food	Sterilizing and Cooling
Soup	Sterilizing and Cooling
Lard	Chilling and Plasticizing
Margarine	Continuous Manufacture
Shortening	Chilling and Plasticizing
Sweetened Condensed Milk, Cooling and Crystallizing of Sugars	
Invert Syrup	Cooling and Crystallizing of Sugars
Eggs	Pasteurizing and/or Chilling
Concentrates, Fruit Juices and Purees	Slush-Freezing
Juice Concentrates, Enzyme Inactivation, Sterilization, Cooling	

the GIRDLER Corporation
VOTATOR DIVISION

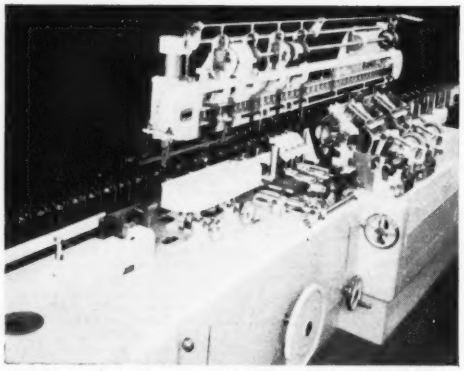
LABELING!

BETTER - because it's done in one motion!

A NEW HIGH in precision labeling is now achieved on Pneumatic Direc-Transfer machines.

No picker plates or gripper fingers are used in transferring the individual labels from stack to container. They are fed and controlled entirely by air suction pads. Each label receives a uniformly thin coating of adhesive, and is given ample time for moisture to penetrate and "temper" the paper stock. Result is exact registration and complete adhesion of label.

Direc-Transfer labeling therefore, *means better bottling* for producers of drugs, liquor, foods, and cosmetics to mention only a few general classifications. Write for Bulletin 116 which illustrates three available models.



Pneumatic's 6-Inch Duplex Direc-Transfer Labeler with Spotting Device

★ ★ ★

PNEUMATIC SCALE CORP., LTD., 91 Newport Avenue, Quincy 71, Mass.
Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.

PNEUMATIC

Packaging and Bottling Equipment

CHECK THESE 3 WAYS YOU CAN SAVE WITH THIS MULTI-PURPOSE INSTRUMENT

Here is the most sensible idea you've ever seen in a recorder or controller—an instrument you can change as your instrument needs change, that you can add to, subtract from, or whose functions you can increase or decrease at little or no expense.

✓ **Save money when you add new functions by adding only those new assemblies needed.**

✓ **Save time-delays by making changes on the job site without returning to factory.**

✓ **Save money on inventory. Parts are interchangeable, fit all Gotham Convertible recorders. You can service a whole group with a minimum stock of basic elements.**

What you can do with the Gotham Convertible

Depending on the chart size of the recorder (6″, 9″ or 12″) you can have a 1-2-3 or 4 pen recorder with 14 pressure, temperature and time operation combinations or a recorder-controller with 38 possible pressure, temperature, and time combinations.

SELF-CONTAINED PORTABLE RECORDER

A portable recorder which has a carrying handle, legs and retaining holder for capillary and bulb. Built from Gotham standard elements, interchangeable with other Gotham instruments. 6", 9" and 12" chart sizes. Mercury, Vapor or Pressure Activated. Spring or electric chart drive. See Catalog 400.

RECORDING PSYCHROMETER

Incorporates the same highly accurate and responsive thermal systems and contains all other Gotham standard convertible features. Wet and dry bulb type. Motor-driven suction fan. 12" chart size. Catalog 400.

RECORDING HYGROMETER

A 2-pen recorder of the wet and dry bulb type. Mercury or Vapor Actuated. 9" and 12" chart sizes. Available with variety of wet and dry bulb assemblies depending on application. Catalog 400.

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Keep everything under control with Gotham

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Division of American Machine and Metals, Inc.
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Please send me a copy of your

- ☐ Catalog 100—Industrial Thermometers
- ☐ Catalog 200—Dial Type Thermometers
- ☐ Catalog 400—Recorders, Psychrometers, Hygrometers
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- ☐ Have your representative call. No obligation.

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For more information, use post card on last page.

"Our operating costs are low with Dodge trucks!"

. . . says **W. J. THOMPSON,** *transportation manager, Carnation Co., Los Angeles, California*

"We've used Dodge '*Job-Rated*' trucks for years, and Dodge engineering has certainly kept pace with our hauling needs," says Mr. Thompson. "Dodge trucks are sure *dependable*—and that's one of many reasons we are now operating a large number in our fleet.

"To deliver dairy products, our trucks have to fight traffic day in and day out. That Dodge short turning radius saves much time and effort for our drivers.

"We have also found that plenty of headroom, 'chair-height' seats and other Dodge cab features mean comfort to our drivers. And a comfortable driver is a more efficient driver. Most important, our operating costs are *low* with Dodge trucks!"

Frozen food men from coast to coast offer solid support to Mr. Thompson's enthusiastic statement. They readily agree that a money-saving truck is one that's engineered throughout to *fit the job*. And they agree that a Dodge "*Job-Rated*" truck is exactly that kind of truck!

Take a Dodge in the medium-tonnage range, for example. Its husky, high-compression power plant makes fuel and upkeep costs stay mighty low . . . thanks to such proved advantages as 4-ring pistons, chrome-plated top rings and exhaust valve seat inserts. Working loads in a Dodge is faster and easier, too, thanks to low ground-to-floor height.

Very likely you'll want to hear the *entire* story on economical Dodge "*Job-Rated*" trucks. There's a friendly fellow who's more than willing to tell it to you at a moment's notice. He's your Dodge dealer—a "nice guy to do business with."

DODGE "Job-Rated" TRUCKS

At this 400-acre "Proving Ground" for Valves

A. E. STALEY Mfg. Co.

consults past performance records . . .
repeats choice of JENKINS VALVES

If you set out to build an industrial "proving ground" for valves, it could include few tougher tests than those imposed in normal services at this 108-building plant for the manufacture of Staley's Corn and Soy Bean Products at Decatur, Illinois.

Processing heavy syrups and concentrates soon seeks out any weak spots in valve design and construction. The punishing work load on valves imposed by tremendous volumes of fluids handled is indicated by the water requirements alone,—over 20,000,000 gallons a day.

Previous experience with the low-cost performance of Jenkins Valves led to their repeated choice for 30 new buildings constructed as part of Staley's multi-million dollar post-war expansion program.

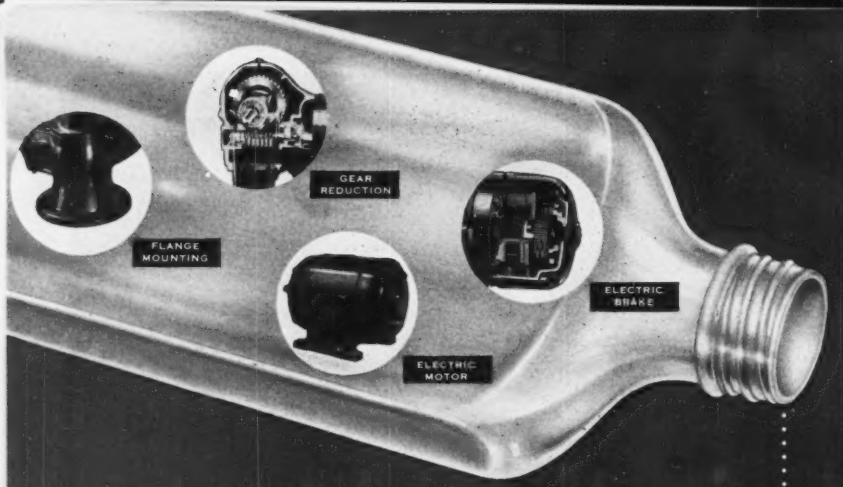
This confidence in the *extra measure* of efficiency and endurance built into Jenkins Valves is shared by plant operating managements in every type of industry.

Despite this extra value, *you pay no more* for Jenkins Valves. For new installations, for all replacements, let the Jenkins Diamond be your guide to lasting valve economy. Jenkins Bros., 100 Park Ave., New York 17. Jenkins Bros., Ltd., Montreal.

CONTROLLING FLOW from a syrup blending tank (above) requires valves that are "maintenance misers". These are some of the thousands of Jenkins Valves in the Staley plant on water, steam, and processing pipelines, and on compressed air piping serving pneumatic ducts for dry products.

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864 TRADE JENKINS MARK

Jenkins Bros



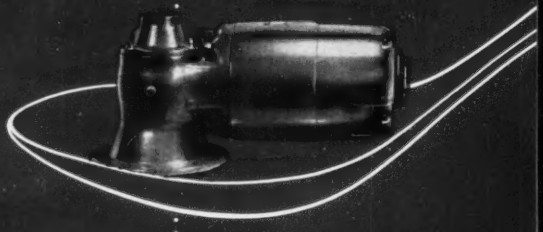
There's no one cure-all

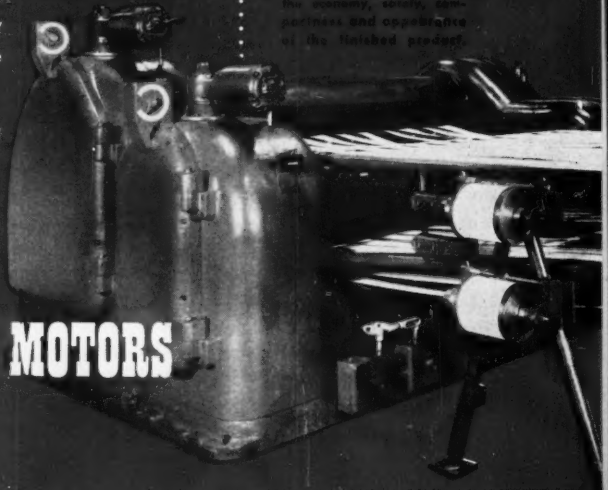
Each case is different. But you can select from Masters broad line the correct combination of features to give you the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

Master Motors, available in thousands and thousands of types and ratings (⅛ to 200 HP) give you a breadth of selection you can get nowhere else. Master engineers can be completely impartial in helping you select the one best drive for you.

Use Master Motors to increase the salability of your motor-driven products . . . improve the economy and productivity of your plant equipment. They're the horsesense way to use horsepower.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO





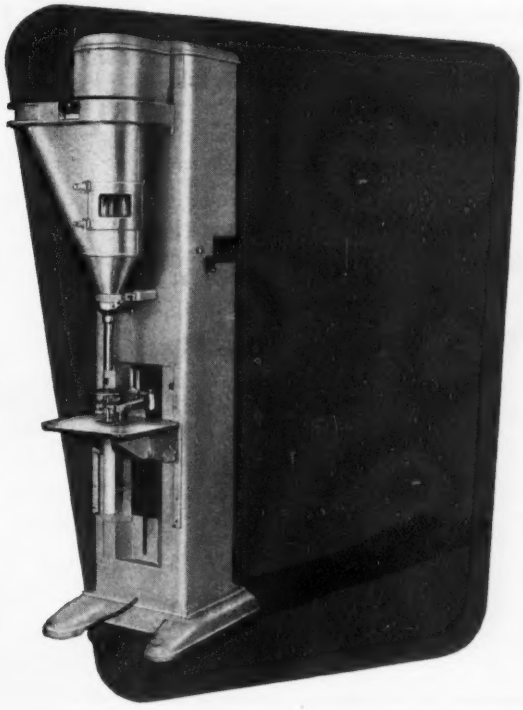
MASTER ELECTRIC MOTORS

S&S *Presents*~

the new
"EG" FILLING MACHINE

This most advanced "E G" Universal Filler, designed and manufactured by Stokes and Smith Company, Philadelphia, Pa., features mechanical parts located above the filling station, and includes many innovations in design, amplifying all of the versatility of the well known S & S G-1 Universal Filling Machines.

For use by volumetric filling—packing against pressure—or with combination auger and vacuum—or gross weighing.



- ***Parts located above filling station.*** Keeps parts clean from dust and dirt; helps reduce cleaning maintenance, makes machine look neater.
- ***40% less working parts.*** Totally enclosed planetary gears run constantly in oil, exceptionally quiet in operation. There are no cams or sprockets. Magnetic clutch is self-adjusting.
- ***Finger-tip changeover.*** Simplified electric control panel is conveniently located near operator.
- ***Auger speed*** *is adjustable from 500 to 1000 RPM.*
- ***Micrometer adjustment*** *for speed and accuracy.*
- ***Pre-timed for greater efficiency.*** Filling cycle can be timed to pace operator for more efficient production.
- ***Adjustable table***—the same augers can be used with varying heights of containers.
- ***Adaptable single and multiple stations*** *for automatic conveyor filling.*
- ***Compact size.*** 24" wide, 31" long, 7'7" high.

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FOOD MACHINERY AND CHEMICAL CORPORATION

FOOD MACHINERY AND CHEMICAL CORPORATION

STOKES & SMITH Co

4911 Summerdale Avenue
Philadelphia 24, Pa.

Pacific Coast
SIMPLEX PACKAGING MACHINERY, INC.
Oakland, California

For more information, use post card on last page.

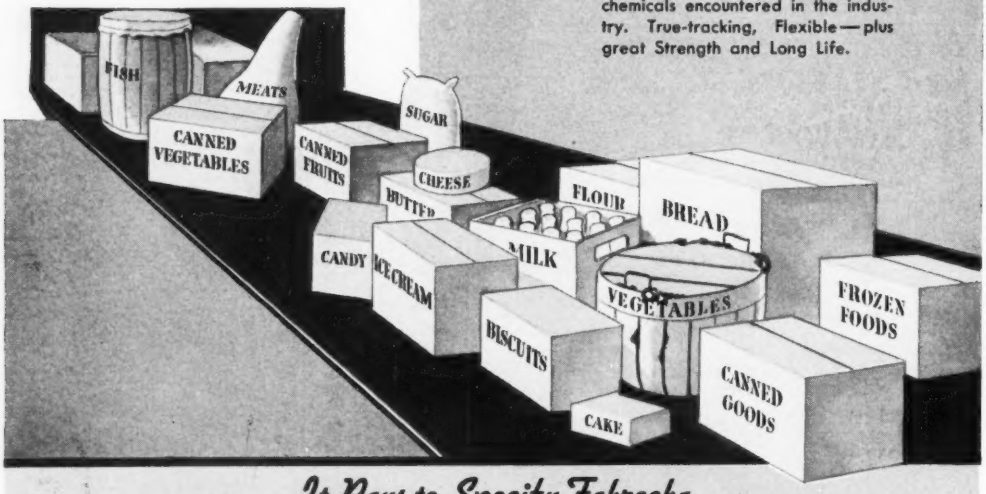
FABREEKA CONVEYOR and TRANSMISSION BELTING

FOOD BELT OF THE NATION!

Increases Production and Cuts Costs in the Processing of America's Food Supply . . . From Field to Dinner Table . . . From Staples to Delicacies . . . From raw product to canned, bagged, packaged, bottled, baked, or frozen foods . . . FABREEKA steps up production and cuts costs all along the line.

Since 1918

FABREEKA Belting prevents costly start-up and production delays . . . has been widely used for years in the Food Industry . . . has freedom from stretch and shrink . . . resists extreme heat, cold, water, brine, and chemicals encountered in the industry. True-tracking, Flexible — plus great Strength and Long Life.



It Pays to Specify Fabreeka

FABREEKA PRODUCTS COMPANY
INCORPORATED

222 F Summer Street, Boston 10, Massachusetts

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PLUG expensive water waste...

with MARLEY AQUATOWERS

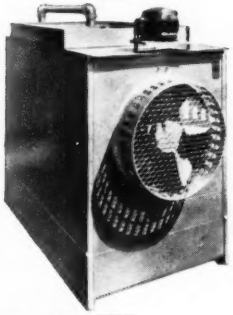
Models 23 and 33
Up to 6 Tons Capacity

Saving 90 percent of the cooling water used for air-conditioning and refrigeration installations is the function of Aquatowers. That's the saving they are delivering every day of the cooling season for more than 7,000 owners . . . and at minimum cost for installation and operation.

Aquatowers do their job so efficiently that they often repay their initial cost in one season. With 17 sizes available, there is an Aquatower to fit precisely every installation of 2-ton capacity or larger without excess first cost or unnecessary power requirement.

Aquatowers are engineered for utmost simplicity of installation and operation. They are shipped completely assembled, ready for operation after water and power connections are made. No expert attention is necessary to keep them functioning at top efficiency year after year.

Double-Flow Aquatowers are prefabricated for on-the-job erection.



Models 53 to 503
Up to 50 Tons Capacity

New Double-Flow Aquatower
Over 50 Tons Capacity
7 SIZES AVAILABLE

ALL STEEL
or WOOD with
Asbestos cement
board casing

producers of
DOUBLE FLOW TOWERS
DRICOOLERS
AQUATOWERS
NATURAL DRAFT TOWERS
CONVENTIONAL TOWERS
SPRAY NOZZLES
DOUBLE FLOW AQUATOWERS

The Marley Company, Inc.
Kansas City 5, Missouri

MARLEY

"VAPOR-VACUUM" NARROW SLIP-ON . .

This is the Narrow Slip-on construction, the exclusive design which makes it possible to re-seal with just an easy *slip-contact*—or to push the cap home to a fully hermetic seal.

. . . a great American Institution

. . . as All-American as apple pie . . . as omnipresent as ham and eggs . . . the Vapor-Vacuum catsup cap is truly a great American Institution. Nearly every home in the land knows it, uses it—and likes it. It is one of the very few articles of branded merchandise which is used *by the billions.* It is favored by consumers and packers alike.

Such universal dominance is a rare thing! But when it exists, it's never hard to find the reasons why. In the case of the Narrow Slip-on, they are simply this:

THE 4 REASONS WHY...

Color, consistency, freshness!

When a food product is as finicky as catsup, its *package protection* must be *perfect.* Not just 99% of the time, but all the time! The consumer expects this, demands it—and won't keep on buying any brand which doesn't deliver it. Therefore the packers of catsup, almost without exception, use Vapor-Vacuum Seals.

Easiest opening and closing!

Catsup bottles aren't only *packages*; they are also serving dishes. And as service dishes, they have a highly difficult job to do. Therefore, *ease of opening and closing* is an absolute necessity. Vapor-Vacuum provides this need—far better than any other cap. Therefore Vapor-Vacuum caps have become an absolute necessity.

Fully hermetic re-sealing!

Among the services a successful catsup package *must* deliver is *protection after opening.* Used as it is, catsup is threatened by discoloration from the minute it's opened. But this threat is completely nullified by the instant airtight re-seal of the Vapor-Vacuum Slip-on. And, again, this cap becomes an inescapable necessity.

Powerful consumer preference!

Consider! The American consumer has bought and used *billions of packages* of Vapor-Vacuum Sealed catsup—and has opened and closed these packages *scores of billions of times.* Result—*it's a habit,* a habit so deeply ingrained that it would be folly to fight it! Therefore packers go along, gladly—and cash in on this happy situation.

"VAPOR-VACUUM" Seal and Re-Seal

PRODUCT OF
WHITE CAP COMPANY

CHICAGO • NEW YORK • SAN FRANCISCO • ROCHESTER • PHILADELPHIA • LONDON, ENGLAND

6-52

Every delivery is "special delivery"!

We can quickly show you why merchants who use Internationals with Metro* bodies get special advantages on every delivery run.

Metros help your drivers do a better job, faster. Metros offer greater package capacity. Metros are more maneuverable, smarter looking, more economical.

This truck offers so many special advantages that it has been first in multi-stop delivery truck sales for 14 straight years. Why not see our Metros soon?

INTERNATIONAL HARVESTER COMPANY · CHICAGO

Check these refrigerated Metro advantages:

- Silver Diamond valve-in-head engine built in the world's largest truck engine plant.
- Maximum maneuverability — 37° turning angle, more positive control, safer, easier handling.
- Leader in the multi-stop delivery field for 14 straight years.
- Four models, 2 body capacities (256.4 or 272.5 cu. ft.) GVW ratings from 5,400 to 10,000 lbs.
- Refrigeration units automatically keep 10° to 50° temperatures even in hot weather.
- America's largest exclusive truck service organization.

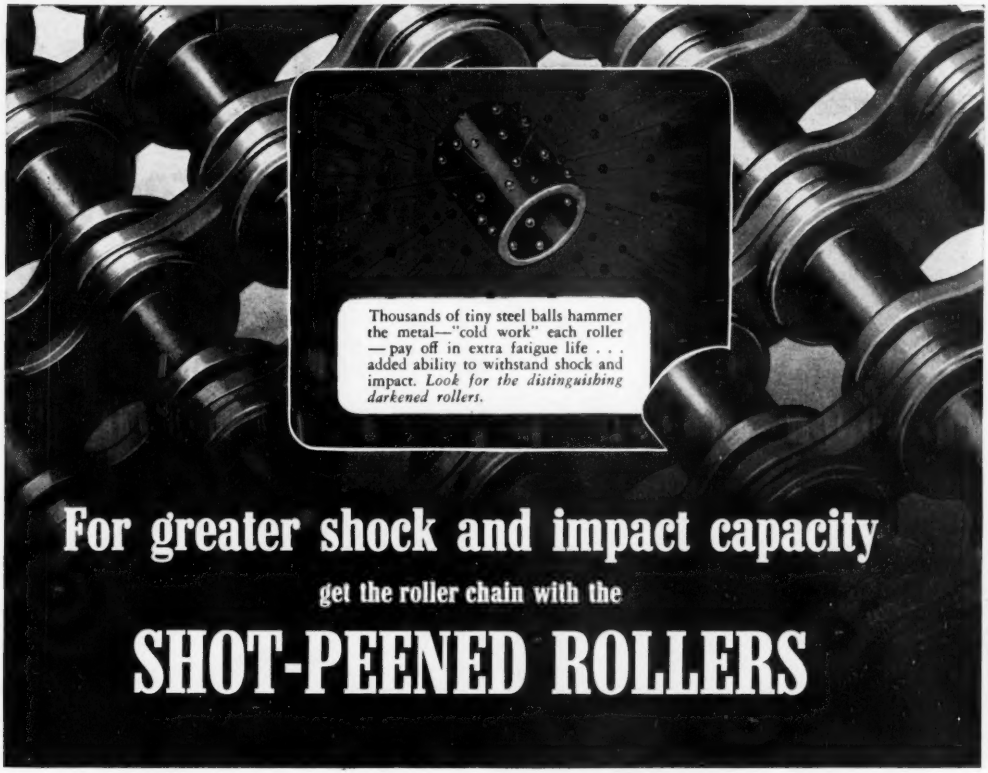
International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

*Metro. Registered trade mark of The Metropolitan Body Company, Inc., subsidiary of the International Harvester Company.

INTERNATIONAL TRUCKS

More than One Million Now on the Road

Model LM-152, 134 in. wheelbase, with 12 ft. refrigerated Metro body, 10,000 lbs. GVW.


Thousands of tiny steel balls hammer the metal—"cold work" each roller — pay off in extra fatigue life . . . added ability to withstand shock and impact. *Look for the distinguishing darkened rollers.*

For greater shock and impact capacity

get the roller chain with the

SHOT-PEENED ROLLERS

. . . one of the extra-wear features you get with every LINK-BELT Roller Chain

JUST as shot-peened rollers give you extra fatigue life—so do Link-Belt's exclusive lock-type bushings multiply roller chain's capacity to withstand shock loading. And there are many other engineering extras that make Link-Belt Precision Steel Roller Chain your best buy for drive and conveying service.

You can choose from the complete range of Link-Belt Precision Steel Roller Chain. Ask your nearest Link-Belt office for full particulars on single or multiple widths, in ⅜" through 3" single pitch, or double pitch, 1" through 3".

Lock-type Bushings increase ability to withstand severe operating conditions

A special manufacturing process securely locks the inside sidebars on the bushing, preventing lateral movement of the sidebars and eliminating a common cause of stiff chains. This Link-Belt development is applied on roller chains through 1" pitch and double pitch roller chains through 2" pitch. 12,698

LINK-BELT

PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, factory branch stores and distributors in principal cities.

..TOUGH SKINS
LOOSENED IN SECONDS
BY THE *fmc* CONTINUOUS HIGH-PRESSURE STEAMER

Cutaway view shows carrots being moved through inclined pressure chamber by screw conveyer.

Increase in yield of ten percent or better over other methods of loosening skins is not unusual with the *standard* model FMC High-Pressure Steamer. Automatically controlled heat penetration provides efficient and uniform loosening of skins without damage to valuable sub-surface nutritional layers. Carrots, beets, potatoes, and many other vegetables (primarily root type) and certain fruits are quickly and continuously processed with big savings in time, labor and steam.

In addition to the standard unit, a *special* model of the FMC Continuous High-Pressure Steamer is now offered with new features which increase capacity from 25 to 50 percent.

Both the *standard* and *special* models are constructed in accordance with ASME specifications.

Write for new Bulletin No. 209A, which fully describes the FMC Continuous High-Pressure Steamer, or call your nearest FMC representative.

FMC CONTINUOUS *ABRASION-TYPE* VEGETABLE PEELER

Provides efficient, thorough peeling of vegetables at a normal average capacity of 2 tons per hour.

First in Diversified Food Equipment

fmc Trade Mark

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

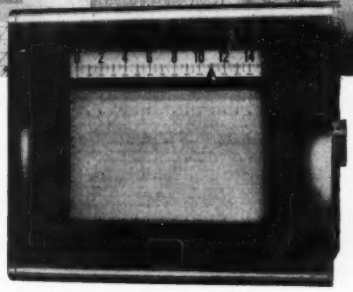
General Sales Offices:

WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

and chose the

BRISTOL DYNAMASTER

Continuous-balancing electronic recorder



The instrument makers whose advertisements appear above know that their reputations depend upon the accuracy and reliability of their recorders. They select each component part with scrupulous care.

As the recording unit in their instruments, they all selected Bristol's Dynamaster. When you choose the Dynamaster for your own measuring needs you are assured of the same accurate, precise instrumentation demanded by these instrument makers.

THERE'S A DYNAMASTER FOR EVERY NEED

Available as a bridge or potentiometer, with strip or circular charts, Dynamasters can measure any variable that can be converted into changes in d-c voltage, d-c current, resistance, or capacitance.

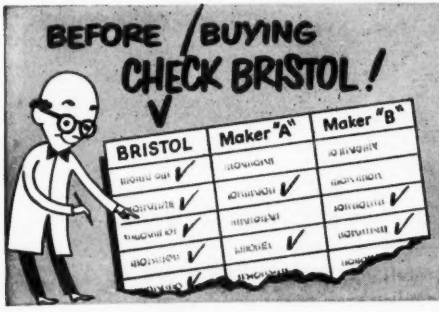
Dynamasters are providing accurate, trouble-free measurement and automatic control of such quantities as temperature, pressure, pH, speed, voltage, power, current, smoke density, strain, and resistance.

BRISTOL

FOR MORE INFORMATION *on the uses of this versatile recorder, use the coupon to get Catalog No. P1245.*

The dependable Guidepost of Industry

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



THE BRISTOL COMPANY
115 Bristol Road
Waterbury 20, Conn.

Please send catalog giving details of Dynamaster performance to:

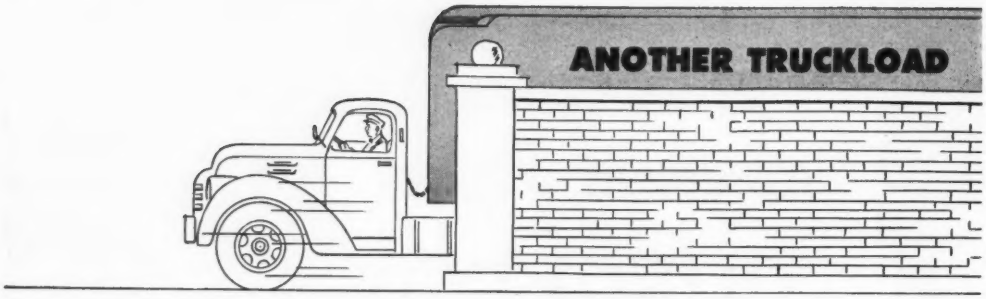
NAME _____ TITLE _____

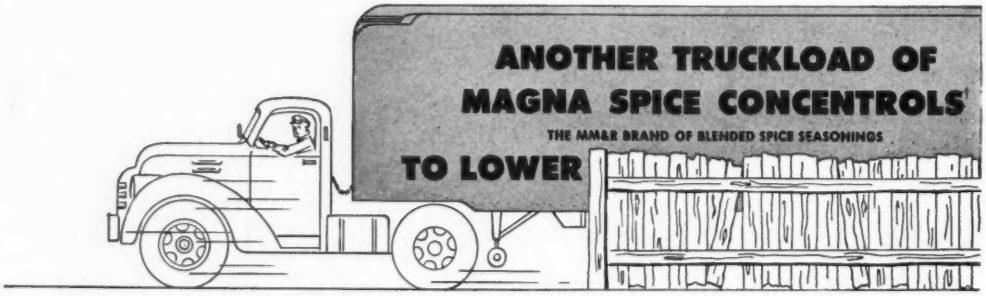
COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For more information, use post card on last page.





ANOTHER TRUCKLOAD OF
MAGNA SPICE CONCENTROLS'
THE MM&R BRAND OF BLENDED SPICE SEASONINGS
TO LOWER FOOD SEASONING COSTS*
*DATA ON REQUEST

'T.M. REG. APPLIED FOR

Every food processor who uses crude spices or dry soluble seasoning will do better with MAGNA SPICE CONCENTROLS. You, too, can count on absolutely uniform control of your flavors. You'll cut seasoning costs from 20% to 40%. And – you can make the change with no change in your present seasoning.

The MAGNA man is the man to see. Write us.

Magnus, Mabee & Reynard, inc.

Since 1895 ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 Desbrosses Street, New York 13, N. Y. · 221 North La Salle Street, Chicago 1, Illinois

STOP DOWNTIME...

Cut Handling Costs!

The Gould "Thirty"—
America's Finest
Industrial Truck Battery

It costs real money when a truck goes out of service because of battery failure. There are two sure ways to keep materials moving, men and machines working: 1. Power your trucks with Gould Industrial Batteries; 2. Maintain <u>all</u> your batteries, regardless of make, with the Gould Plus-Performance Plan. This *free* system of preventive maintenance is making money for hundreds of industrial firms by helping them keep their batteries new, longer.

It will pay to learn more about Gould Industrial Truck Batteries and the Gould Plus-Performance Plan. Write Gould Battery Information Headquarters for full information.

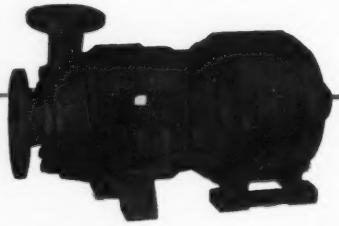
GOULD
Industrial Batteries

GOULD-NATIONAL BATTERIES, Inc., TRENTON 7, N. J.

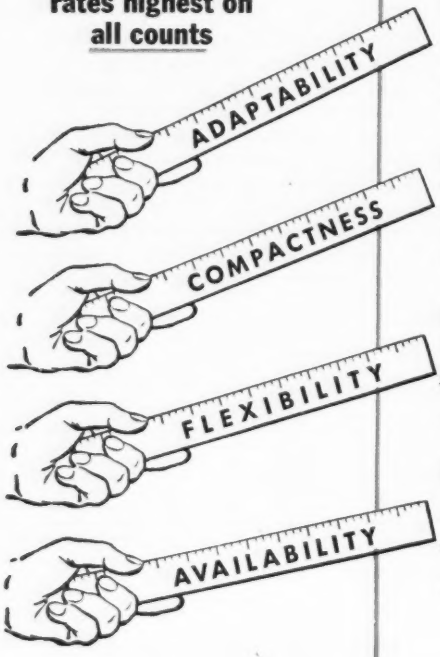
Always Use Gould-National Automobile and Truck Batteries

For more information, use post card on last page.

Four ways to measure REAL PUMPING ECONOMY



You'll find that the I-R MOTORPUMP rates highest on all counts



The Motorpump line is so complete that you can get a pump that's designed to handle your particular capacity and head requirements at *maximum efficiency*. Sizes range from ¼ to 50 hp, for capacities from 5 to 1800 gpm and heads to 650 ft.

The space-saving design and light weight of the unit-type Motorpump cut installation costs. Motorpumps can be mounted in "close quarters" where no other type of pump would fit. No special foundations are required.

Motorpumps operate equally well in *any position*—can be mounted horizontally, vertically, or any angle; on floor, wall, columns or ceiling. This flexibility of mounting often permits simpler and more economical piping arrangements.

Despite current shortages of many industrial products, you can still get prompt delivery on Ingersoll-Rand Motorpumps. Most of the popular sizes are carried in stock and can be delivered immediately from branch or factory. This avoids costly delays—both in pump replacement and new installations.

MOTORPUMP **Ingersoll-Rand**

11 BROADWAY, NEW YORK 4, N. Y. 758-9

ROCK DRILLS · COMPRESSORS · AIR TOOLS · CENTRIFUGAL PUMPS · TURBO BLOWERS · CONDENSERS · DIESEL AND GAS ENGINES

7 SOUND REASONS WHY TRENTWELD IS BETTER

1. TRENTWELD large diameter (4" to 40") Stainless Tubing is precision-finished.
2. TRENTWELD large diameter Stainless Tubing is made in a tube mill by tube specialists.
3. Tested cold rolled sheets are completely fused into finished tubing without added rod metal.
4. No zone of weakness for corrosion to attack.
5. Uniform section, metallurgically correct.
6. Available for fabrication with your fittings, whether welded, van stone or clamp type.
7. All finishes available.

in large diameter stainless steel tubing...

the TREND *is to* TRENTWELD

There is a strong trend to TRENTWELD in Large Diameter (4" to 40") Stainless Tubing and the reasons are sound. Fabricators, designers, manufacturers of *all* processing equipment find their most rigid specifications fully met by TRENTWELD.

Further, there is more than top quality tubing in an association with TRENT. You gain engineering experience that is both broad and deep. You gain specific help in putting stainless tubing to work in your own application. Write for more data, and tell us about the particular applications you are working on right now.

TRENTWELD

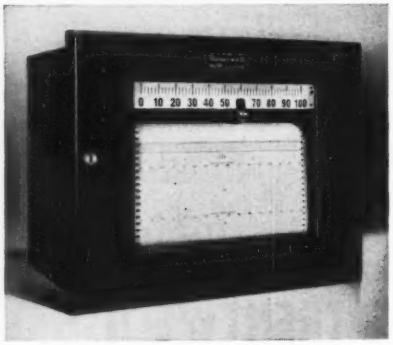
STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)

MILESTONE IN '40—STILL GROWING IN '52

ONLY a few years ago, the science of sensitive, accurate measurement was confined to the laboratory. But today, this science is practiced every day in thousands of industrial plants—by people who need no specialized technical skills.

Production men wanted to put this science to work, for they had known for some time that many processes would function at greater efficiency if temperature, pressure and other variables could be more accurately maintained. Although these potential benefits could easily be proved in the laboratory or in pilot plants, they could seldom be exploited fully in actual production. One of the big reasons was that existing industrial methods of measurement were not sufficiently accurate, sensitive or fast. The inherent limitations of galvanometers and mechanical balancing systems always required a compromise between sensitivity and ruggedness . . . and could provide only periodic measurements.



A FAMILIAR SIGHT *to thousands of production men, scientists and engineers is this strip-chart* ***ElectroniK*** *Recorder . . . one of a complete family of indicating, recording and controlling instruments.*

Then, in 1940, the advent of *ElectroniK* instruments swept away these limitations. By adopting an entirely new approach—electronic continuous balancing—these instruments revolutionized the concepts of industrial measurement. They placed laboratory accuracy and sensitivity at the disposal of the production man . . . with all the simplicity and ruggedness demanded by industrial service . . . *plus* a speed of response never before economically practical.

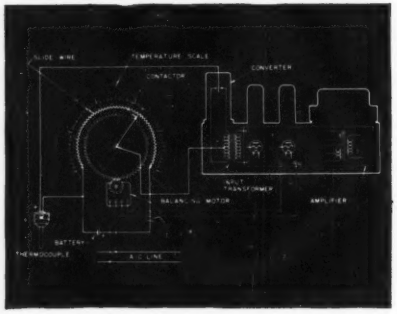
In the past twelve years, thousands of plants have discovered almost endless applications where the superior performance of these instruments helps to improve operations. The more they learn about *ElectroniK* instruments, the more they call on them to execute increasingly complex tasks of measurement and automatic control.

Since 1940, the *ElectroniK* family has grown and matured—not merely in step with the times, but in anticipation of the needs of the future.

Modern methods

UTILIZE

Honeywell's continuing development has brought forth a host of new models, including advanced types of automatic control . . . and will be ready with even more advanced equipment for tomorrow's process control problems.



THIS IS *the* ***ElectroniK*** *power plant . . . which amplifies by millions of times the minute electrical signals from thermocouples and other sensing elements.*

HUNDREDS OF TEMPERATURES *at widely separated locations in a big grain terminal are at this operator's fingertips. He presses a push-button to select the point he wants to check, and reads temperature on a fast, accurate* ***ElectroniK*** *Precision Indicator.*

in the Food Industry

ElectroniK INSTRUMENTS

SINCE their advent in 1940, *ElectroniK* instruments have helped to make food processing history . . . especially on many of the newer, revolutionary processes . . . by making a practical reality of measurements which were formerly considered difficult, inaccurate, or even impossible. Here are some outstanding *ElectroniK* contributions:

Temperature measurement: centralized data-recording, on multi-point instruments, improves supervision of aseptic canning, juice concentration and many other new processes.

Temperature control: *ElectroniK* resistance thermometers set new standards for precise regulation of milk pasteurization, candy cooking, evaporation.

Conductivity control: boosts efficiency of caustic peelers.

pH Control: provides truly automatic, *continuous* neutralization of cream.

Speed control: automatic regulation of oven speed improves quality of baked goods.

Density control: invaluable in processing of liquid sugar to constant Brix value, and in many other applications.

The horizons are wide; the possibilities of instrumentation are endless. When you're planning new processes, or modernizing existing equipment, it will pay you to plan on utilizing the performance of *ElectroniK* instruments—wherever you need to measure or control. At your service is a wealth of Honeywell application experience, gained through years of intensive work with the food industry. You can benefit by this know-how; just call your local Honeywell engineer . . . he is as near as your phone.

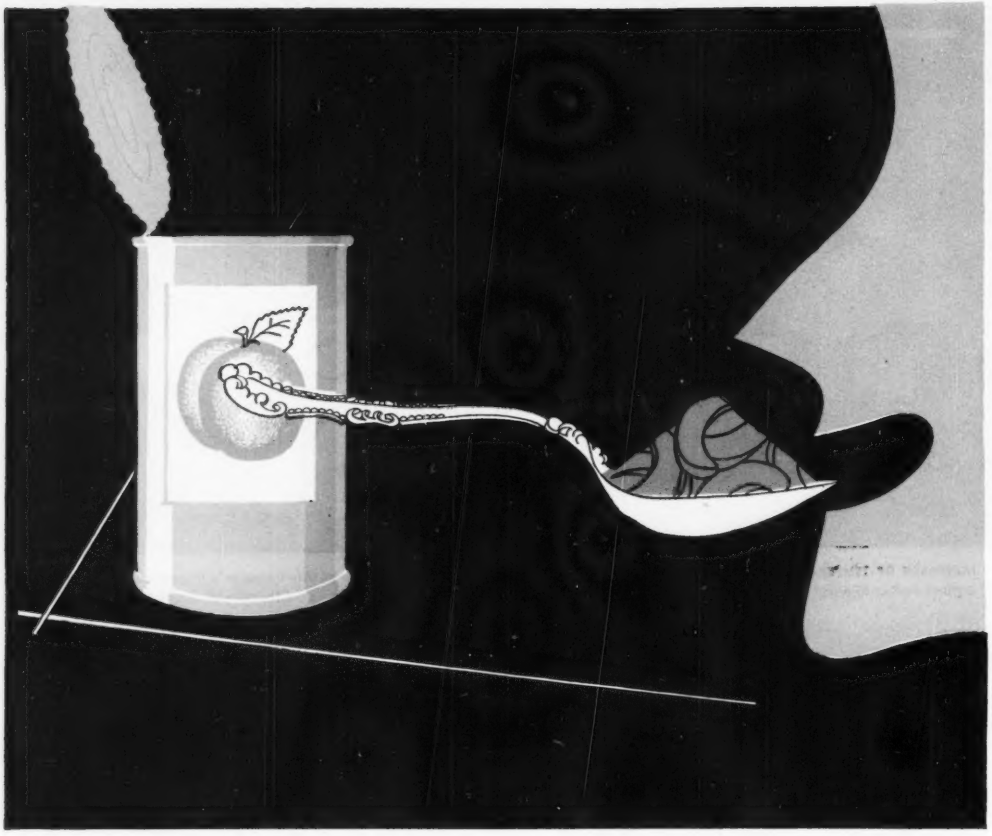
MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Penna.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS

First in Controls

● *Important Reference Data*

Write for Catalog 15-15; "*ElectroniK* Potentiometers"... and for Data Sheets on specific applications in the food industry.



SUGAR in the pack means *flavor* at its peak!

Most canners use sugar*—and *only* sugar—in their packs.

Why? Because canners have learned that sugar-sweetened packs taste better, keep better, sell better.

Sugar provides 25 to 50% more sweetening power— is easier to use— requires no special handling or storage.

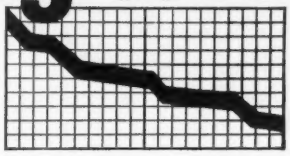
Use sugar to improve palatability, preserve natural color, and prevent material changes in the texture of cellular structure.

Experience has established its dependability. Consumers prefer its high quality.

SUGAR INFORMATION INC.
NEW YORK 5, NEW YORK

*Sucrose

Down go filling costs!

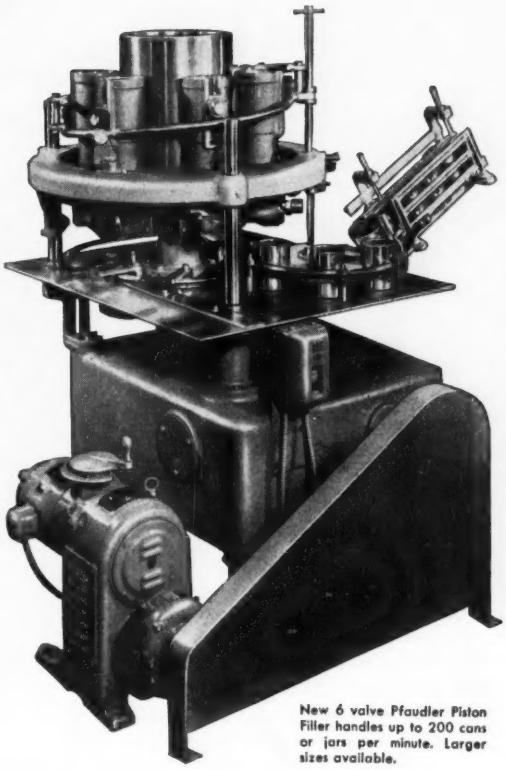


Pfaudler Piston Fillers show big savings for companies packaging liquid to semisolid products.

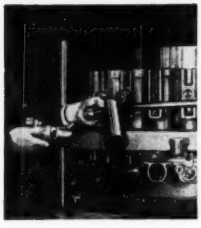
FAST—Because Pfaudler Piston Fillers deliver high-volume output at top speed, fewer fillers are needed to do the job. Capacities range from 100 to 600 containers (cans or jars) per minute, depending on viscosity of product handled. Result: saving in initial equipment.

VERSATILE—You can handle a wide variety of products with this machine—potted meats, gravies, heavy or light lubricating oils, syrups, processed cheese, to mention a few. The Pfaudler Piston Filler provides the positive action needed for accuracy of fill. Instantaneous volume adjustment controls accuracy within a fraction of an ounce.

EASY-TO-CLEAN—Hours of costly labor for cleaning are eliminated because both the pistons and self-compensating cut-off valves are removable in one piece by hand. No tools needed. Pfaudler offers this cost-saving feature exclusively! Besides, the Pfaudler "no-can-no-fill" feature protects you against wasteful spillage.



New 6 valve Pfaudler Piston Filler handles up to 200 cans or jars per minute. Larger sizes available.



EXCLUSIVE FEATURE

Pistons and self-compensating cut-off valves easily removed by hand for fast, easy cleaning. Saves hours of work, cuts costs.

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Piston Fillers · Steam Peelers · Deaerators · Vacuum Pans · Evaporators

THE PFAUDLER CO., Dept. FE-6, Rochester 3, N.Y.

Send me the facts about Pfaudler Piston Fillers right away.

Name_____ Title_____

Company _____

Address_____

City_____ Zone____ State____

STRETCH OUT YOUR STAINLESS, TOO

There *are* ways to stretch out your supply of stainless.

For example, you may be using a grade or finish of stainless that is in extreme demand when another similar one, not as tight, could do the job adequately.

Our metallurgical staff and stainless fabricating specialists are ready to help you look into this matter and to advise you on more readily-available types of stainless that will do a satisfactory job. Feel free to call on us for this specialized help.

CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

STAINLESS STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REZISTAL STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

this Pump pays its own way ...and MORE!

Here's the secret. This impeller has no blades to catch or damage food products.

You'll find a Fairbanks-Morse *Bladeless* Impeller Food Pump will more than pay for itself . . . in a short time. It eliminates the food damage losses so common with ordinary transfer pumps . . . assures important savings in handling costs.

Fairbanks-Morse *Bladeless* Impeller Pumps have handled the most delicate fruits and vegetables *without damage*. Even hard-boiled eggs have been pumped without cracking.

You'll find it will pay you to investigate the Fairbanks-Morse *Bladeless* Impeller Food Pump for your operations. For complete information, call your Fairbanks-Morse Branch Pump engineer or write to Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

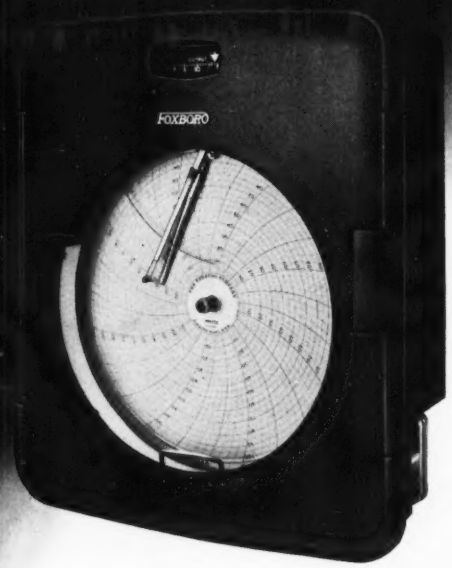
FAIRBANKS-MORSE,

a name worth remembering

PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • SCALES
HOME WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY • MAGNETOS

better measurement and control of

FLOW



Wherever highest accuracy and complete reliability in flow measurement and control are vital to successful processing, it is significant that Foxboro Instrumentation is preferred. Whether your problem involves gas, steam, or liquids . . . in pipes, ducts, or open channels . . . the premium quality and complete diversity of Foxboro Instruments, backed by unequaled application experience, assure you an extra measure of satisfaction.

indicators • recorders • controllers • integrators
transmission systems • controlled valves • orifices
venturis • nozzles • pitot tubes

FOXBORO
Reg. U. S. Pat. Off.

For over 40 years, specialists in the measurement and control of temperature, pressure, flow, liquid level, humidity . . .

THE FOXBORO COMPANY • FOXBORO, MASSACHUSETTS, U.S.A.

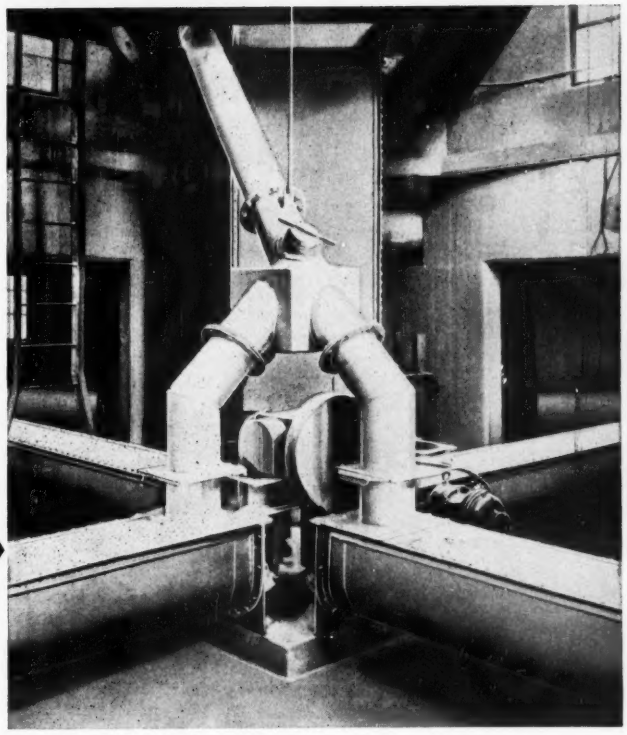
Why LINK-BELT "total engineering" means better screw conveyors for you...

LINK-BELT integrates all components to give you the right screw conveyor for your job

Don't be fooled by the apparent simplicity of a screw conveyor. It *is* simple in design, but there are many important factors that must be considered to give you top performance.

That's why Link-Belt's broad materials handling experience is so important... why Link-Belt Screw Conveyors are first choice on so many demanding jobs. And because Link-Belt makes all types and sizes of components, you get exactly the right screw conveyor for your particular requirements.

It's easy to see why "total engineering" results in top screw conveyor performance. Call the Link-Belt office near you for complete information.

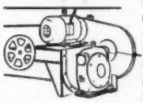


Four Link-Belt Helicoid Screw Conveyors distribute material from Link-Belt Bucket Elevator discharge.

LINK-BELT designs and builds all components!

TROUGHS—Link-Belt builds flanged, angle flanged, flared, rectangular, dust-seal, jacketed and drop-bottom types in steel or alloy metals. Variety of connections, supports, covers and clamps offers added design flexibility.

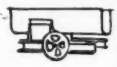
TROUGH ENDS—Steel or alloy metal plate or cast trough ends to match all trough shapes, provide required shaft bearing support and alignment. Seal glands to protect bearings, if required.



DRIVES: Link-Belt designs and builds many forms of drives to suit specific conditions—enclosed gear, Electro-fluid, P.I.V. variable speed, and chain drives of various types.

SCREWS—Link-Belt makes a complete range of conveyor screws—Helicoid, Sectional Flight, Cut Flight, Ribbon Flight, Paddle type and special

types for such diverse applications as feeding, conveying, mixing, agitating, stirring, blending, etc.



SPOUTS & GATES—Plain discharge spouts can be fixed or detachable. Discharge gates, flat or curved slide, can be hand or rack-and-pinion operated.

Link-Belt can also supply a full range of flanges, thrusts, covers, saddles and countershaft ends

HANGERS—Available in a variety of styles and mountings, with various bearing materials, and steel or cast hanger frames.

SHAFTS & COUPLINGS—Conveyor couplings and end shafts are designed for adequate torsional strength and have jig-drilled coupling bolt holes for accurate alignment.

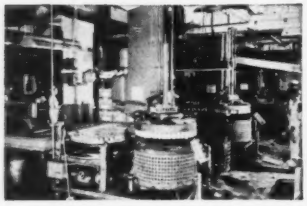
LINK-BELT

SCREW CONVEYORS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities. 12,000

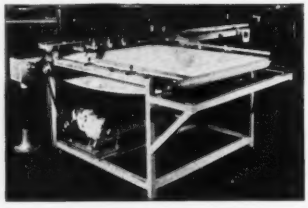
TIME and MONEY SAVING EQUIPMENT FOR THE FOOD PACKER

Three of our many installations, which have proven profitable to food packers, are illustrated and described below. These are offered as examples of the results of our work in collaboration with food packers and on specific problems. If you have similar or other problems in your plant it will pay you to talk to a Barnes' process engineer. There is no obligation for this service.



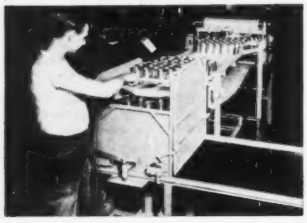
Load 500 Jars Per Minute

This Barnes retort crate loader handles 500 baby food jars per minute. It is one of many different machines designed and manufactured by Barnes to help the food packer lower costs, speed up handling, and minimize breakage.



Unscramble 500 Jars Per Minute with Barnes Single Filer

Here's a new, efficient method of unscrambling empty jars. The illustration shows operating end of machine where girls are positioned while dumping cases of glass onto the receiving conveyor belt. Jars are discharged to conveyor at the rate of 500 to 600 per minute, determined by size and shape.



Unload Over 600 Cans Per Minute with Barnes Packaged Can Unloader

This new dual purpose machine can be operated with only two men in continuous production while unloading 3 to 4 bags of cans per minute. The Barnes unloader handles 3 bags, each containing 265 No. 303 cans per minute, or 795 cans.

FREE ADDITIONAL DATA on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for bulletin E652.

W. F. & JOHN BARNES

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 310 SOUTH WATER STREET, ROCKFORD, ILLINOIS

(ADVERTISEMENT)

City Health Department Investigates Martin Aseptic Canning of Fresh Whole Milk

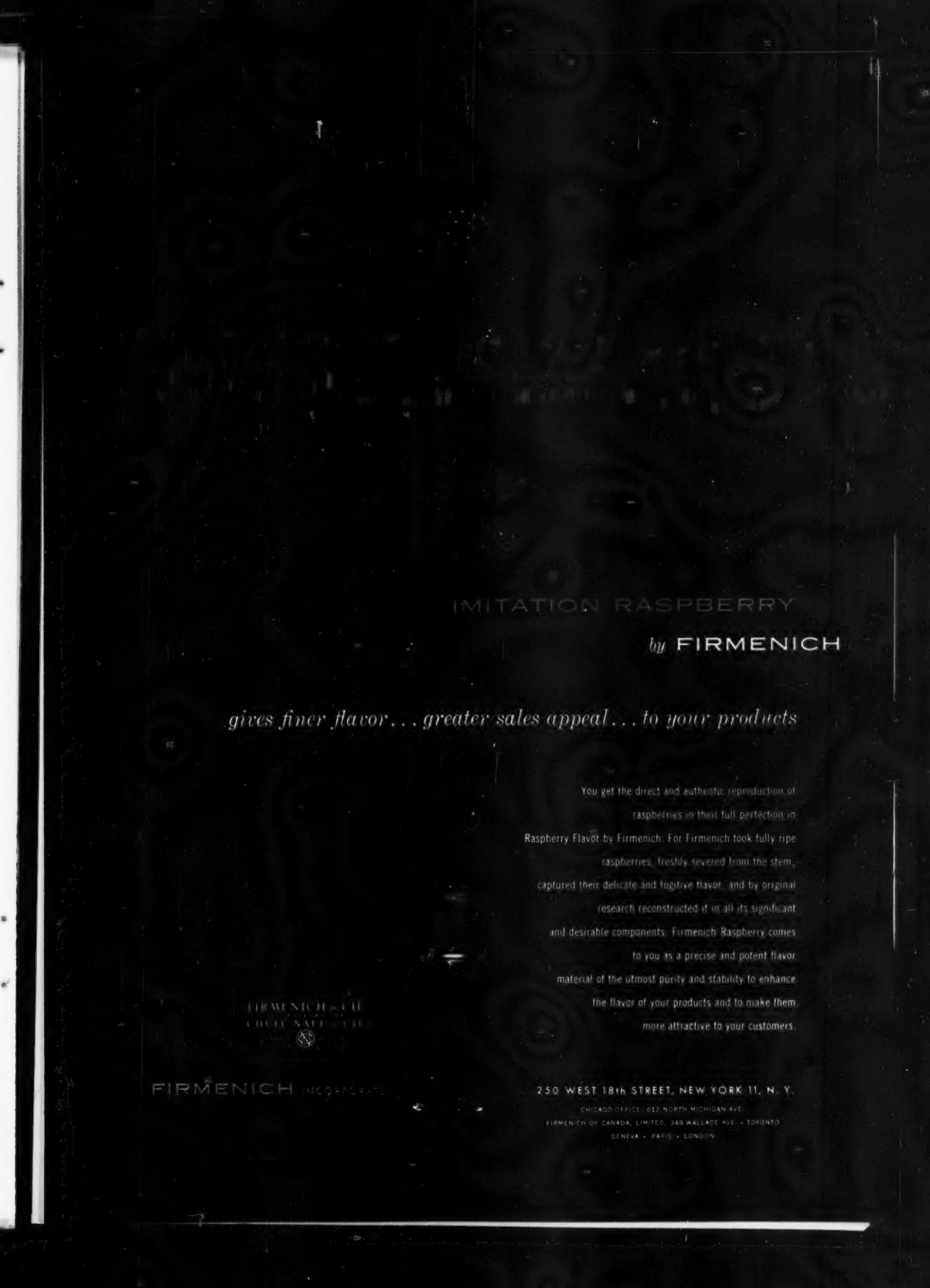
The population of Rockford, Illinois is approximately 100,000. The daily consumption of whole milk approximates 57,000 quarts. Recently, the Rockford City health department made a local sanitary field study of the Martin Method of Aseptically canning milk and milk products. This was done in anticipation of the possibility of one or more Martin Aseptic canning units being installed in the Rockford Metropolitan area.

Find Finished Product of "Good Flavor, Color, Texture, and Good-Keeping Quality"

Among the many features found in the summary of the Rockford Health Department Report are those of commercial value as we have stressed in this column previously. From a public health standpoint they report: "Clinical laboratory test results apparently reveal that the Martin Method of Aseptically canning sterilized milk and milk products in sealed containers can meet acceptable public health standards of sanitation."

Only Two Units Required to Serve City of 100,000

Only two Martin Aseptic canning units would be necessary to handle the daily demand for fresh milk in Rockford. For further information on this interesting system write to W. F. and John Barnes Co., Process Equipment Division, 301 South Water Street, Rockford, Illinois.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You get the direct and authentic reproduction of raspberries in their full perfection in Raspberry Flavor by Firmenich. For Firmenich took fully ripe raspberries, freshly severed from the stem, captured their delicate and fugitive flavor, and by original research reconstructed it in all its significant and desirable components. Firmenich Raspberry comes to you as a precise and potent flavor material of the utmost purity and stability to enhance the flavor of your products and to make them more attractive to your customers.
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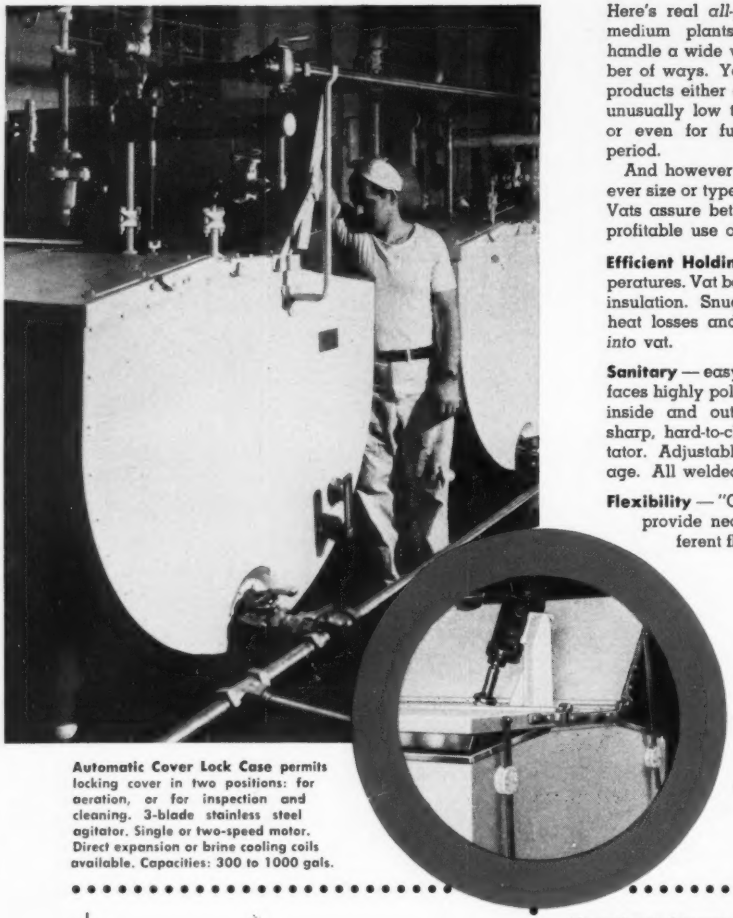
For Low-Cost, Space-Saving <u>All-Purpose</u> Storage

USE CHERRY-BURRELL "CR" STORAGE VATS



Automatic Cover Lock Case permits locking cover in two positions: for aeration, or for inspection and cleaning. 3-blade stainless steel agitator. Single or two-speed motor. Direct expansion or brine cooling coils available. Capacities: 300 to 1000 gals.

Here's real *all-purpose* storage for small or medium plants. Cherry-Burrell "CR" Vats handle a wide variety of mixes . . . in a number of ways. You can use them to store your products either at constant temperatures or at unusually low temperatures for long periods, or even for further cooling during holding period.

And however you use them . . . with whatever size or type batch . . . Cherry-Burrell "CR" Vats assure better product quality—and most profitable use of plant facilities. Here's why:

Efficient Holding of all products at low temperatures. Vat body lined with 2-inch corkboard insulation. Snug-fitting flanged covers reduce heat losses and prohibit any moisture drain *into* vat.

Sanitary — easy to clean. Product contact surfaces highly polished stainless steel. All parts, inside and out, completely accessible. No sharp, hard-to-clean corners. Removable agitator. Adjustable legs pitch vat for fast drainage. All welded body construction.

Flexibility — "CR" Vats installed in batteries, provide necessary flexibility to store different flavors and types of mixes.

Ask Your Cherry-Burrell Representative about space-saving, all-purpose "CR" Storage Vats. Or clip coupon.

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For more information, use post card on last page.

This floor really curbs development of . . .

this condition

Anti-Bacterial Cement Gives Longer Lasting Floors

Active germicide, incorporated in cement, permanently checks bacteria that break down masonry, thus reducing costly maintenance. When used on walls and ceilings, it inhibits molds and fungi and effectively controls odors

DAVID LEVOWITZ
Director, New Jersey Dairy Laboratories, New Brunswick, N. J.

Food processors have long known that the durability of even the most rugged mortars and concretes is much less in their plants than in other industries. Meaning extra outlays in man-hours and money.

But now the researchers of one large manufacturer—the North American Cement Corp., 41 E. 42nd St., New York City—have found the reason for this quick deterioration.

And having found it, they have done something about it.

Result is an anti-bacterial cement that promises substantial economies to food plant operators by:

- ▶ Abolishing the need for special surface-sanitization programs
- ▶ Reducing surface maintenance costs

First, a brief of the whys and wherefores:

Cement and Masonry

Portland cement is prepared by mixing calcium carbonate (derived from limestone, marl or chalk) with clay, shale, or blast furnace slag. Then this mixture is burned to "clinker," at temperatures of incipient fusion, and ground to a fine powder.

The individual particle is a complex in which tricalcium and dicalcium silicates account for more than 70 percent of the mass, with tricalcium aluminate tetracalcium aluminoferrite, calcium sulfate, and some other ingredients, making up the balance.

All of the ingredients are quite insoluble in neutral water, but can be expected to dissolve in solutions of both high and low hydrogen ion concentration. It is readily understood, therefore, why waters for use in making cement masonry must be so carefully selected.

It has been hypothesized that the cementing reaction is a result of the cement particles' surface molecules combining with water, to form a gel

20 cases tell the story. ***Turn page*** ⟶

from which the ingredients crystallize into their even less soluble hydrates. The hydrates' crystals interlock, enmeshing, in addition to each other, the non-reactive aggregate—added to produce maximum density and stability at lowest cost.

Intended use of cement masonry dictates the maximum size of the aggregate particles. Mortars for grouting tile, plaster coats, etc., employ only clean, sharp sand with cement and water. For concretes, in addition to the fine aggregate, clean, weathered gravel and crushed stone are also used.

In sound masonry, the cement, dispersed to paste in water, wets each particle of aggregate, and the smaller units fill all the spaces between the larger ones. As the cement hydrates, the crystals bind the non-reacting particles together, yet prevent aggregate-to-aggregate contact.

The fact that the cement masonry sets almost immediately is credited to the prompt hydration of the aluminates, while the gradual increase of strength (noted as the masonry ages) is due to the less rapid hydrate formation by the silicates. In "high early strength" cements, the reactions occur more rapidly than in "regular."

For the most rugged masonry, the amount of water used must be kept to the minimum (to provide a mix just viscous enough to pack without leaving voids).

For sound masonry, the mixing must be rapid yet thorough. The mix must be transported carefully to prevent aggregate sedimentation. It must be tamped and worked skillfully to compact properly. And it must be protected from evaporation and held at a suitable temperature to insure uniform hydration.

Deterioration in Food Plants

Portland cement cannot, from its composition, be expected to make chemical-proof masonry. With average care, however, it has demonstrated most satisfactory durability at hundreds of chemical plants, where extremes of hydrogen ion concentration are frequently encountered.

Nevertheless, at food plants, where the pH range is usually much more limited, "pointing up" and patching are so frequently necessary that integral concrete has been largely replaced by tile set in cement mortar. And in some instances, where maintenance costs warranted, this latter has been replaced by tile grouted in resin.

Since cement-masonry performance was reported as particularly poor at dairy processing plants, a North American Cement Corp. research team studied a number of such installations. Floors were found to be wetted with concentrated dairy product (through overflow, spillage, and drippage) and also with dilutions thereof. Dairy products were spread about on the floors by squeegeeing, wiping, and brushing.

Further dilution—and spread—was attained by washing with water and various types of detergents and sometimes antiseptics. At the end of the most rigorous washing, floors were always wet, and still carried both fermentable nutrients and microorganisms capable of thriving on them. Except in refrigerators, the floors' temperatures were always capable of stimulating microbiologic development.

End products of carbohydrate, fat,

Benefits Demonstrated In Score of Installations

How It's Helped Floors

1. BREWERY (Brooklyn)—Concrete bases of "in-the-bottle pasteurizers" continuously subjected to spraying with hot water containing varying percentages of beer from broken bottles.

Old flooring: Required replacement every 3-4 months.

► New type concrete: Rough only after 13 months, and then not yet sanding.

2. SUGAR REFINERY (Brooklyn)—Concrete floor under mechanical bag washer wetted intermittently by hot-sodium hydroxide-phosphate solution.

Old flooring: Replaced every 3-4 months.

► New way: Roughness noted only after 9 months, and then just in hollows where poor pitch had permitted liquid accumulations. Some sanding found at edges of drains, but flooring smooth in rest of area.

3. CHEESE PLANT (Morrisville, Vt.)—Concrete floor, under centrifuge that concentrates curd, subjected to acid in coagulated milk.

Old flooring: Needed complete replacement annually.

► New: Roughness not noted until after 2 yr., and then only where poor pitch allowed liquid to stand. Remainder of surface smooth.

4. BREWERY (Bronx, N. Y.)—Regular concrete under wort tanks continuously wetted with wort and wash water.

Old flooring: Replaced semi-annually.

► New: Fully smooth after 2 yr., except where pools formed from poor pitch. Here, surface was only slightly rough.

5. DAIRY (Philadelphia)—Concrete floor of return-milk handling room wetted with milk during entire working day.

Old flooring: Required constant patching, plus frequent overall replacement.

► New: Surface smooth after 2 yr., except in hollow adjoining drain (filled with milk when viewed) where surface was rough.

6. DISTILLERY (Cockeysville, Md.)—Concrete gutters carry spent fermenting liquors out of plant.

Old gutters: Surface reduced to aggregate in single season.

► New: With lining of ½-in. layer of new cement, surface still smooth after 2 seasons.

7. ICE CREAM PLANT (Brooklyn)—Regular masonry groutings of tile drainage paths exposed to dairy products, fruit juices, cleaning and sanitizing compounds.

Old: Groutings required continual pointing up.

► New: Groutings still like new after almost 2 yr.

8. BUTTER PLANT (Hagerstown, Md.)—Area: Cream processing room.

Difficulty: Through employee's error, concentrated, uninhibited phosphoric acid was used for cleaning Vacreator for several weeks, resulting in complete stripping of nickel finish from this unit and its supply pump and fittings.

► But: ABC floor "took" all this and was fully smooth. After 2 yr. only drainage path evidenced some roughening.

9. MILK HOUSE (on farm, Herndon, Va.)—Milk cooler set on concrete slab, in turn placed on special concrete floor. Both exposed to run-off water from cooler.

Old: Surface of supporting slab of regular cement concrete reduced to aggregate in 6 months.

► New: Floor of ABC perfectly smooth after 1 yr.

10. MILK RECEIVING STATION (New Windsor, Md.)—Area: Floor, walls, and ceiling.

Problem: Floor deterioration, and odors when room is closed for a time after cleanup.

► With new masonry: After 1½ yr., floor smooth. No odor in

protein, and mineral metabolism are usually acid.

This acid reacts with the cement constituents, solubilizing them. And while the daily effect might be extremely small, the net result after a number of weeks, is to form slight cavities—increasing the surface on which future end-products will react, lengthening the time taken for moisture to dissipate, and accelerating the rate of deterioration.

In chemical plants, the acid which may encounter cement masonry will, if not removed, be neutralized by some cement constituents, and the reaction thus brought to a halt.

In food plants, however, the acid end-products of fermentation will be neutralized by the floor's cement components—but the fermentation itself will continue as long as nutrient, microorganisms and moisture remain. Though desiccation will stop the acid generation, the cyclic re-wetting of the next day's operation reinitiates it. The fermentation cannot be halted, or its direction changed by end-product accumulation as in a culture flask, because the acid is continually being neutralized.

Cement masonry floors in breweries and sugar refineries were also found to owe their deterioration to microbiological fermentation. To be sure, surface treatments with a wide variety of disinfectants had been attempted, in an effort to sublimate "floor fermentation aroma"—the only immediately observable symptom. But none of these treatments had ever been found more than transiently effective.

When fermentation's acid end-product solubilization becomes sufficiently advanced, microscopic channeling into the masonry begins, and the dendritic surfaces thus exposed permit more accelerated deterioration.

Thus, fine aggregate is undercut and loosened, to roughen the surface. Gradually the coarse aggregate is loosened, too. And ultimately, the masonry disintegrates completely **(see "break down" sketches on page 60).**

The North American Cement Corp's. research group decided that in order to achieve the durability desired in food plants, the cement masonry had to have incorporated in it an anti-bacterial agent potent enough to permanently sublimate microbiological metabolism.

Could a germicide be dissolved in the mix water to yield the required result?

Many trials finally brought out the fact that those soluble agents which were compatible with cement (which permitted achievement of the gross structural characteristics required) were so soon eroded from the surface as to be useless.

Could germicides be dispersed in the mix water?

Such insoluble antiseptics behaved like fine aggregate—many tests showing that they could not be dispersed homogeneously. The cementing reaction is molecular—the additive would have to be, too. It would have to be incorporated in the cement particle.

The additive would, of course, have to be fully compatible with cement's ingredients. Its solubility, though minescule, would have to be sufficient to definitely sublimate microorganism metabolism on the surfaces, and throughout the mass of masonry.

▶ Germicides of the desired characteristics were found, and a way of building them into the cement particle developed.

Now it was a matter of finding the

---

room even on hot summer afternoon, in spite of being shut for several hours.

How It's Curbed Growths and Odors

11. BREWERY (Bronx, N. Y.)—Area: Barrel-storage room walls.

Old way: Molds grew on the regular mortar.

▶ New: Area of wall patched with ABC showed no mold growth after 2 yr., except at overlap with regular mortar.

12. DISTILLERY (Cockeysville, Md.)—Area: Walls and ceiling of fermentation room.

Old: Constant fungus development. Regular-mortar areas treated unsuccessfully with assorted germicidal preparations in effort to prevent growths.

▶ New: Panels coated with ABC mortar completely free of mold after more than 2 yr.

13. BREWERY (Philadelphia)—Area: Filter room, in which humidity approaches 100 percent at all times.

Old: When covered with regular mortar, areas were always blanketed with multicolor microbiologic growth.

▶ New: Walls and ceiling coated with ½-in. ABC mortar still completely clean after 2 yr.

14. FISH PROCESSING PLANT (Newark, N. J.)—Walk-in refrigerator surfaced with tile set in regular cement mortar.

Probelm faced: Mold on walls and ceilings, with extremely heavy growth on floors and wall areas on which food dripped. Persistant odor.

▶ New: Surfaced with ABC masonry, new refrigerator showed no fungus development in 2 yr. Periodic scrubbing and hosing down render room free from odor.

15. SILO (on farm, Edgewood, Md.)—Area: interior surfaces.

Old: When built of wood or regular masonry, surfaces were constantly covered with mold.

▶ New: Interior finished with ½-in. thickness ABC mortar proved free from surface growth after 2 yr.

16. BREWERY (Bronx, N. Y.)—Area: Tile-lined barrel-filling room.

Old: Tiles grouted with regular mortar were covered with mold.

▶ New: Groutings pointed up with new type mortar demonstrated absence of mold after 2 yr.

17. BOYS' SCHOOL (Lawrence, Mass.)—Area: Floors of shower room.

Problem: With regular cement floors, spread of athletes'-foot fungi was serious.

▶ New way: Floors of ABC cement have completely eliminated the problem.

18. OUTDOOR SWIMMING POOL (Falls Church, Va.)—Area: Exposed surfaces.

Old: When built with regular cement, algae accumulations proved common.

▶ New: With lining of ABC, algae formation entirely curbed.

19. SANITARIUM (Berkeley Springs, Va.)—Area: Reservoir and cement-stone spring sluiceway.

Old: Stones grouted with regular cement collected deposits of algae.

▶ New: Reservoir lined with new cement (also special cement specimens tested in sluiceway) showed no algae deposits at end of 2 yr.

20. CLUB BUILDING (Burlington, Vt.)—Area: Floors of shower, locker, and lavatory rooms.

Old: Regular masonry tended to "carry" athletes'-foot fungi.

▶ New: Problem eliminated by new cement.

very best one for the contemplated use.

When regular cement masonry is made, lime is liberated through the initial reaction of cement components with water. The hydrogen ion concentration of the lime is an effective microorganism inhibitor during the first weeks of a masonry's life—longer if there is less water contact.

Proved in Laboratory

To avoid confusion in laboratory tests, the regular and modified cement masonries were cured completely to eliminate the lime factor. Samples were then subjected to conditions equivalent to the most rigorous which might ever be encountered by food-plant floors.

The masonries made from one compound were found superior to all others tried. And the modified cement containing this ingredient was given the name "ABC" (for "Anti-Bacterial Cement") by the North American Cement Corp., the patent owner.

► In laboratory tests, these masonries showed that they could prevent microbiologic growth in the monomolecular layers of nutrient which might be expected on the floors of food plants that practiced normal housekeeping.

The anti-bacterial agent was not expected, nor intended, to leave the masonry to cope with a more substantial residue. Its purpose is to protect the masonry, not to sterilize a massive coating.

Test Installation

Just before World War II, laboratory production of ABC was converted to pilot scale. Thus enough material was made for an actual trial on a food plant floor, and subsequently the traffic lane of a dairy processing room floor, at Alfred, N. Y., was laid with this concrete.

But then pressure of other work, during and after the war, caused the ABC project to be held in abeyance.

However, three years ago, when the company's representatives were informed that the Alfred plant was to be converted to other use, they revisited it. In spite of the eight years' wear, they found the surface of the traffic lane entirely perfect, except at the drain mouth, where it was only slightly roughened.

Since regular concrete previously installed at the same plant had been completely deteriorated in a much shorter time, the company's interest in ABC was revived. Sections of concrete were broken out of the Alfred dairy floor. Tests showed the compressive, flexural, and tensile strengths to be excellent, and the anti-bacterial agent's concentration to be undiminished.

Three years ago, air-borne contamination at food plants was, as it is today, a widely discussed topic. If ABC masonries could cope with the complete monomolecular nutrient layer renewed daily on floors, certainly they should be able to compete with the less complete layer carried to walls and ceilings by vapor convection.

It should even be able to inhibit microorganism growth at the masonry-water interfaces, as long as they remained clearly defined. (If masonry is covered with a thick layer of fermentable material, such as cheese curd, ABC's job is to prevent the masonry from being damaged—rather than to prevent the curd from fermenting at its exposed surface.)

Years vs. Months

The performance at Alfred was impressive; the installation had been expertly planned and executed. It was decided, therefore, that wherever conditions at food plants were described as particularly detrimental to regular cement masonry—where its life was measured in months rather than years—ABC would be recommended.

No special precautions were to be demanded in its utilization, so that its performance under average conditions might be appraised. It was suggested that a portion of each installation might be made with regular cement. But there could, of course, be no insistence on this.

A few months ago, all who had used ABC were questioned on their experiences with it. Responses indicated that the new cement fully met the specifications created for it. The writer and members of North American's research staff visited a score of installations where rigorous conditions had been surmounted. The 20 cases are summarized in the panel on p. 58-59. The first ten are concerned chiefly with durability on floors; the second ten with inhibition of microbiological activity on walls and ceilings.

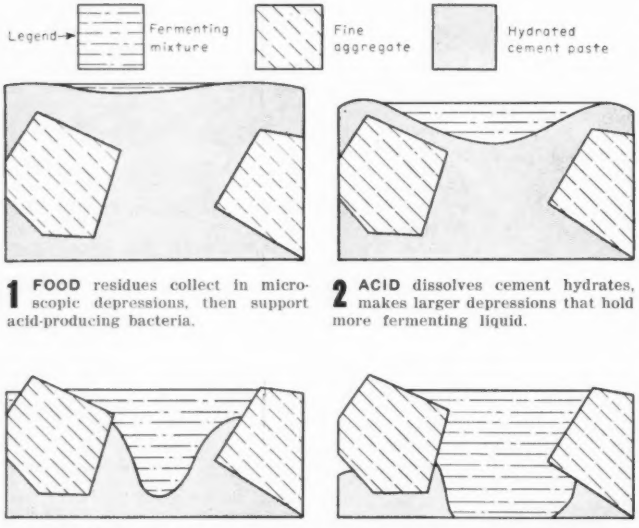
How to Use It

The inspections at the various installations disclosed that, while many demanded much of the ABC, none had yet defined the life expectancies of the masonries. A masonry's life is measured from its initial setting to its replacement, and there is no way of relating the different stages of disintegration to total durability.

This was not only surprising, it was particularly gratifying, since some of the installations demonstrated poor planning and workmanship. How much better the results would have been if the masonry had been more properly made!

(Turn to page 134)

How food plant floors break down

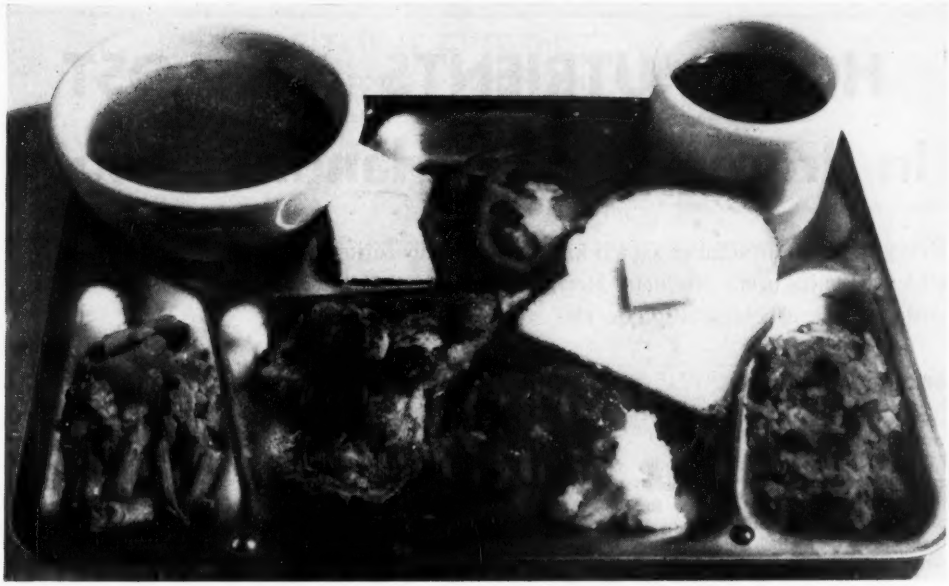


1 **FOOD** residues collect in microscopic depressions, then support acid-producing bacteria.

2 **ACID** dissolves cement hydrates, makes larger depressions that hold more fermenting liquid.

3 **DISSOLVING** of hydrates is accelerated, baring portions of the fine aggregate.

4 **AGGREGATE** is now undercut and loosened, causing the masonry to disintegrate completely.



TYPICAL "good" Navy dinner. Back of it are a multitude of food problems. (USN photo)

BETTER FOOD FOR NAVY

To provide food to the Navy, you must meet special requirements. Recent food developments that please are named. But there is a longer list of desired improvements. Here is a challenge

ARTHUR C. AVERY

Technical Director, Commissary Research, U. S. Naval Supply Research & Development Facility Bayonne, N. J.

Come "chow-down," a new sailor knows that he can make this statement, regardless of what type of ship he is aboard: "I am the best-fed Serviceman in the world."

But Navy feeding in general–and each ship in particular–presents special problems. Storage space always has been at a premium. And both food-preparation and mess-hall space have had to be used most efficiently. Now, new detection, fire-control, and other equipment demand additional space. So we are facing this situation:

More food must be placed in less space. And it must require less heat and manpower to convert it into a more acceptable form.

The acceptability factor is of prime importance. Servicemen demand that the Navy give them the type of food to which they are accustomed. Furthermore, each man in charge of a mess makes out his own menu and orders the food from the supply bases. This means that a new Navy food item has to make a highly favorable impression on the commissary personnel before it will be used.

Quality control is a prerequisite for any food product if it is to attract and hold the Navy's interest.

Functional Requirements

To evaluate new commercial food products, and to develop or modify foods for Naval usage, the Navy maintains the Commissary Research Division of the U. S. Naval Supply Research & Development Facility at Bayonne, N. J. This organization is ever on the lookout for foods which will offer these advantages:

1. **Save space.**
2. **Require less labor.**
3. **Save cooking heat.**
4. **Be waste free.**
5. **Make it easier for inexperienced cooks to prepare good tasteful dishes.**
6. **Reduce storage and shipping losses.**
7. **Be more acceptable than similar items now in Navy supply channels.**

What the Navy Has

A dozen food developments in the past few years have been of considerable interest to the Navy. These seem to promise solutions to some of the special food problems. Here they are:

1. *Better quality dehydrated vegetables and fruits.*
2. *Stabilized dried eggs.*
3. *Frozen table eggs.*
4. *Dried whipping cream.*
5. *Frozen juice concentrates.*
6. *Premixed bakery products.*
7. *Prefabricated meats.*
8. *Frozen vegetables and fruits.*
9. *Canned meats of improved quality.*
10. *Canned cheese mixtures.*
11. *Precooked frozen meats.*

(Turn to page 135)

HOW NUTRIENTS ARE LOST In Processing and Handling Foods

Every food manufacturer should know how his operations affect the value of his products. Here is a practical analysis with a quick checklist to guide you

BERNARD L. OSER
Director, Food Research Laboratories, Inc., Long Island City, N. Y.

Vitamins are by no means the only nutritional components of foods which can deteriorate or be lost in cooking. Nor are cooking procedures the only factors which affect nutritional values.

Various conditions of exposure or treatment to which foods are subjected, and how each may affect nutritional components, are summarized in our table (next page).

The first column lists the five major classes of nutrients in foods, not including water. And 16 important vitamins are named. Major items in the table are numbered to correlate them with the following discussion.

Listed across the top of the table are the various conditions of exposure which may cause loss or destruction of nutrients in foods processed commercially or at home. It is important to realize that many of these factors are interrelated. The adverse effects of heat, light, or air, for example, are dependent on the time of such exposure. In some cases, the oxidative loss on exposure to air occurs only at increased temperatures. The effect of acidity or alkalinity may depend upon the presence of sufficient water or air.

A casual inspection of this table might give the impression that most, if not all, of the value of food is lost in its preparation. This, of course, is not so. It is essential to bear in mind that the losses with which we are here concerned are a matter of degree only. Knowledge of the factors concerned makes it possible to reduce and control them.

1—Processing Affects Proteins

The fact that processing affects proteins has not been appreciated sufficiently until recent years. Application of sufficient heat may either destroy essential amino acids or bind certain of them in such a way that they can no longer be utilized by the body.

To cite a few examples: Milk protein, which ordinarily has a very high biological value, may be impaired by heat. Roller-dried milk is heated to a greater degree than is spray-dried milk, and consequently, has a lower biological value. Some loss in biological value occurs in the protein of wheat flour during baking, especially when the temperature is sufficient to cause browning, as on the crust of bread or rolls.

The extent to which such loss occurs in the manufacture of breakfast cereals during the drying, flaking, toasting, exploding—or similar treatment involving high temperatures—has not yet been fully explored. It is known, however, that in some cases—rolled oats is an example—no diminution in biological value occurs during heat processing.

Strangely enough, certain of the proteins, like that of the soybean, actually improve in biological value upon sufficient heat processing. Hence it is dangerous to make generalizations in this field.

Mild heat treatment—such as boiling or broiling—has little effect on the biological value of meat proteins. But exposure to higher temperatures—as in baking or roasting—tends to reduce both the digestibility and the biological value of meat protein. Even storage at ordinary atmospheric temperature for a long period of time—common in the grain and cereal industries—has resulted in significant diminution in the biological value of the proteins of wheat, nonfat milk solids, and possibly other foods.

A reaction between sugars and amino acids, known as the browning reaction, is accompanied by a loss of availability of these amino acids. Thus, any food which tends to brown excessively, as a result of either heat treatment or storage, should be suspected of having lost some of its value so far as its protein is concerned.

Heat treatment (unless carried to excess) does not actually destroy the amino acids in the protein molecule. But, such treatment results in changes in the rate at which individual acids are released during enzymatic digestion, an important factor in efficient protein utilization.

2—Carbohydrates Altered

Various conditions can affect the stability of sugars, starches, and other carbohydrates in foods. But these are not always accompanied by actual losses in their food (i.e., energy) value. Even when the heat and acidity (or alkalinity) is sufficient to cause caramelization of sugars, only slight loss of nutritional value occurs.

When microorganisms attack carbohydrates to the extent of causing fermentation, the caloric value is reduced. The reactions causing the decomposition of the sugars or starches are enzymatic, and can occur even in the absence of living microorganisms.

3—Fat Rancidity

Development of oxidative rancidity in fats exposed to air is, as everyone knows, increased with temperature and time. Less well known is the fact that light has a catalytic effect on this oxidation. So it is desirable to pack food fats in opaque or dark-glass containers.

Except that they impair palatability and sometimes cause gastric indigestion, rancid fats are not, per se, less nutritious than neutral fats. The free fatty acids liberated upon hydrolysis are no different from the free fatty acids released in the gastrointestinal tract by the action of digestive enzymes. Rancidity, however, accelerates or catalyzes the oxidative destruction of other nutrients, such as vitamins A and E.

4—Loss of Inorganics

Little is known about the exact form of chemical combination in which the various inorganic elements—like iron, calcium, copper, manganese, and

NUTRIENT CHECKLIST - - -

PROCESSING FACTORS AFFECTING NUTRITIVE VALUES

(Extent of these effects is highly variable and often dependent upon interrelations in the conditions of treatment or exposure.)

Key: x = Affected; X = Strongly affected.

Nutrient ↓	Water ↓	Air ↓	Heat ↓	Time ↓	Light ↓	Acidity ↓	Microorganisms ↓	Reactions: Enzymic ↓	Reactions: Nonenzymic ↓
1. Proteins			X	x					x
2. Carbohydrates			x	x		x	X	x	x
3. Fats		X	x	x	x				x
4. Inorganic Salts	x		x						
5. Vitamins									
Thiamine (B_1)	x		X	x		x		x	x
Riboflavin (B_2)	x			x	X	x			
Niacin	x								
Ascorbic Acid (C)	x	X	x	x	x	x		X	x
Pyridoxine (B_6)	x				x				
Pantothenic acid	x		x			X			
Folic acid	x				x	x			
Biotin	x								x
p-Aminobenzoic acid	x								
Inositol	x								
Choline	x					x			
Cobalamine (B_{12})	x						x		
A (& carotenes)		X	x	x	X	x		X	
Calciferols (D_2, D_3)						x			X
Tocopherol (E)		X	x	x					x
Vitamin K		X			x				

iodine—are present in foods. These elements are present principally in the form of inorganic salts soluble in water.

So operations which involve exposure to or treatment with water, followed by subsequent discarding of the aqueous extract or juices, cause a substantial loss of mineral salts. As much as 25 percent of the ash content of raw peas can be extracted by boiling for 8 min. in water containing a pinch of baking soda. Almost half of the ash of cabbage is lost in the cooking water.

5—Vitamin Problems

Loss of nutritional value by leaching with water is even greater when we consider the water-soluble vitamins. Here, we are dealing not only with compounds that are more soluble, but with nutrients which are susceptible to destruction by other agencies such as heat, light, and acidity, while they are being extracted from the foods.

B_1, B_2, and Niacin

Thiamine, or vitamin B_1, is one of the most heat-labile, as well as one of the most soluble, of the vitamins. As the pH is increased from the acid range to neutrality and beyond, the vitamin becomes increasingly unstable. Thus the excessive use of baking soda has a detrimental effect on vitamin B_1.

Riboflavin, or vitamin B_2, is relatively more stable to heat. However, it is quite susceptible to destruction by light. If exposed in transparent bottles to sunlight, milk loses its riboflavin rather rapidly. And it has recently been shown that vitamin-enriched bread wrapped in transparent cellophane suffers a loss of riboflavin upon exposure to light.

Most stable of three vitamins in the B group is niacin. Its loss is due mainly to water extraction, facilitated, of course, by higher temperatures.

Loss of vitamins by water extraction is not limited to cooking. Drippage from frozen beef has been shown to contain 10 to 15 percent of the major B vitamins, and as much as one-third of the original pantothenic acid.

Vitamin C

Rapid loss of vitamin C is caused by exposure to air, particularly at elevated temperatures, or in the presence of water, or for prolonged periods, or in neutral or alkaline media. Any combination of these factors will hasten the loss, either by extraction or oxidation.

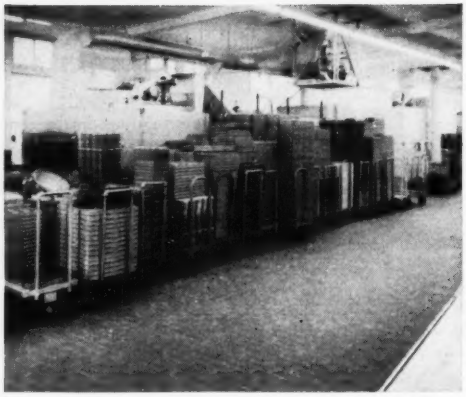
Oxidation takes place in two stages. The first product, dehydroascorbic acid, has about the same biological activity as reduced ascorbic acid. But it no longer reacts to the common chemical reagents for its determination. Thus, unless special steps are taken for the determination of dehydroascorbic acid, the oxidative loss of vitamin C may be overestimated.

The second stage of the oxidation results in the formation of diketogulonic acid, which has none of the biological activity of the vitamin. It is possible, by the proper choice of analytical methods, to determine not only how much ascorbic acid is present in foods but how much was initially present and subsequently oxidized.

It is interesting to note that during the process of germination of legumes as well as of cereal grains, a marked increase in vitamin C content occurs. But in subsequent fermentation, as with barley in the brewing industry, vitamin C content is lost by oxidation.

Continued action of enzymes in fresh fruits and vegetables results in

(Turn to page 140)



SPIC-AND-SPAN sweet goods department (left) and cake shop (right) are excellent examples of good housekeeping in Fuchs bakery. The immaculate conditions are direct results of rigid, photo-punctuated sanitation system.

They Licked Careless Housekeeping With

Photo-Spurred Sanitation

When Florida bakery "mirrored" plant untidiness to its employees by posting candid see-all pictures, the response was quick: Workers saw messiness in its real light and readily cooperated to banish it

R. E. CHIVERS
Assistant General Manager, Fuchs Baking Co., South Miami, Fla.

Plant and product inspections are not enough to keep a bakery thoroughly clean—especially in a semi-tropical climate such as we have here at Fuchs Baking Co., South Miami. ▶**To make the sanitation program really work there is also required basic employee education supplemented with very specific reminders.**

Sanitation Checks and Balances at Fuchs

Who Handles	Type of Inspection or Control	Frequency
Fuchs Baking Co.	Pictorial display of poor sanitation practices in plant (bulletin boards)	Intensively several months each year
Fuchs Baking Co.	Routine plant inspections, followed by reports distributed to all foremen	Weekly
Orkin Exterminating Co.	Insect control and extermination	Bi-weekly
Orkin Exterminating Co.	Complete sanitation inspection, with detailed report on every facility	Every two months
State of Florida, Dept. of Agr.	General plant, equipment, and employee checkup for sanitary rating	Every two months
Dade Co., Fla.	General employee health and plant cleanliness inspection	Several times each year
American Institute of Baking	Laboratory examination of finished products checking for foreign matter	Continuously
W. E. Long Laboratories, Chicago	Laboratory examination of finished products checking for foreign matter	Continuously

In our case, we implemented this "must" training by snapping photos depicting poor housekeeping practices and posting them on our bulletin boards throughout the plant. The pictures were straight-from-the-shoulder "as is" shots taken during regular inspections and then enlarged to show the housekeeping offenses with greatest impact.

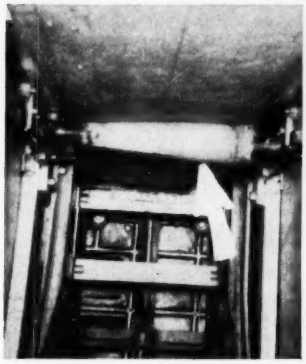
Proof of how well this has worked are the photos above. The bad-example pictures (next page) are now all past history. Today it's pleasingly difficult to find any such scenes to shoot.

Through this program we got the fullest help from our employees, who thus actually saw what not to do. The idea of photographic presentations—suggested by Buster Garfield, head of Florida's food-plant inspection group—put new life into our system of sanitation checks and balances.

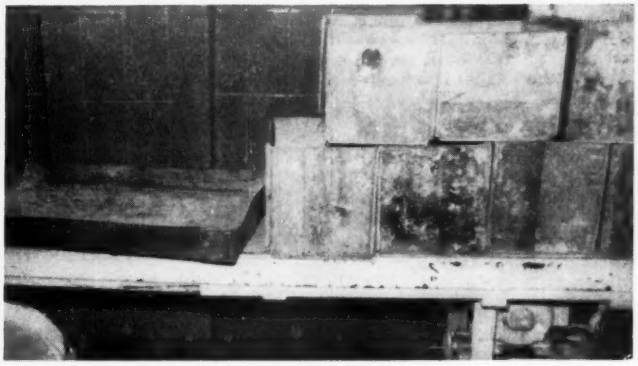
Every Nook and Cranny

Essentially, our sanitation system consists of: (1) Keeping the processing

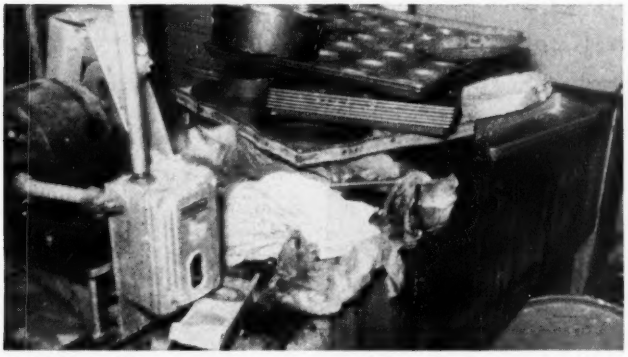
Blunt-Truth Camera Shots That Got Employees Busy



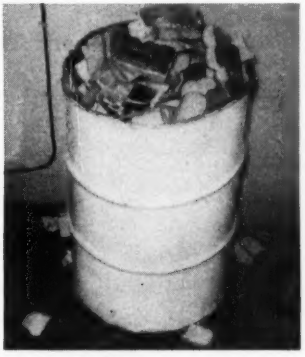
HERE, icing (arrow) has caked up roller on underside of conveyor belt.



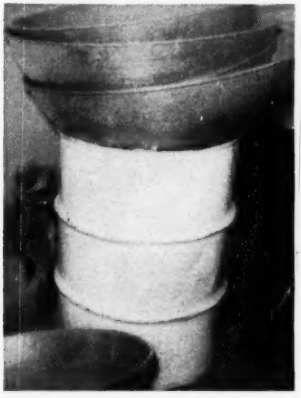
BAD PRACTICE of putting boxes and trays on conveyor belts was eliminated by posting pictures like this for all employees to see.



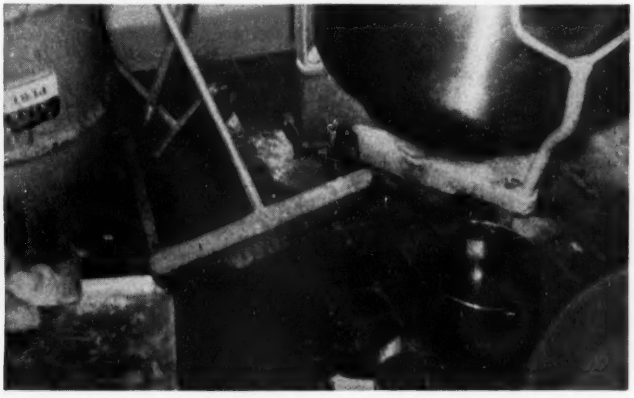
UNKEMPT corners in cake shop no longer plague inspectors now that pointed photos have done work of emphasizing the messiness.



FULL refuse cans are now promptly emptied to prevent overflowing.



BATTER bowls no longer are carelessly "stored" in garbage drums and on the floor.



TODAY, conditions like these are non-existent at Fuchs. Employees now stress policy: "A place for everything and everything in its place"—which has resulted in a much more alert approach to the problem of plant sanitation.

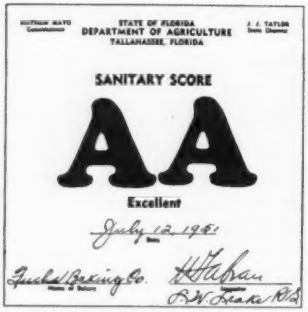
Turn Page for More Bad-Example Photos ⟶

equipment and buildings clean, (2) control of insect life to a minimum and extermination of rodents, (3) a series of intensive voluntary and state and county plant inspections, and (4) voluntary lab analyses of our bakery products checking for insect eggs and foreign matter.

Orkin Exterminating Co. provides us with a tough, unbiased food-plant inspection service on a contractual basis. It breaks down each building into definite areas and really scrutinizes them with a fine tooth comb.

Check for Insect Eggs

Constantly targeted are insect and rodent infestation, dusty out-of-the-way corners (such as tops of beams and undersides of pallets), wall and floor cracks where insect eggs can hatch, and improper storage—both of raw material and finished goods.


STATE OF FLORIDA
DEPARTMENT OF AGRICULTURE
TALLAHASSEE, FLORIDA

SANITARY SCORE

AA

Excellent

July 12, 1951

Then overall conditions of the interior and exterior of the plant are briefed and specific recommendations are made covering corrective measures that should be taken in every department.

Our own management follows up Orkin's visits with weekly check-tours to make sure that the suggestions are being carried out. Each department foreman receives a copy of the sanitation reports and is responsible for initiating the steps necessary to rectify any infringements.

Both the state and county inspections are also quite inclusive—though not as frequent. Our score of AA (Excellent) in the state ratings indicates that our program is paying off with solid results.

Worker Education

We feel that without proper employee indoctrination, we couldn't have gone as far as we have. And the picture-posting scheme has undoubtedly played an important role in spotlighting sanitation needs to the personnel and—above all—getting their cooperative action in these efforts.

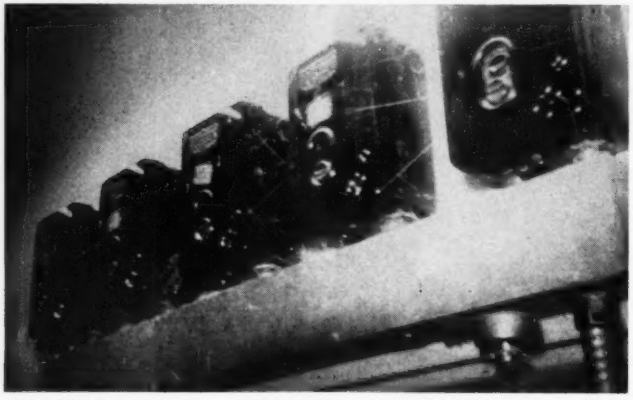
Blunt-Truth Camera Shots (Cont'd)

MIXING blades don't belong here—and the workers promptly found out.

WAREHOUSE areas like this have been cleaned up—and kept that way.

MESSY lockers are now kept neat—not just part of the time.

EMPLOYEES' aim improved considerably after seeing this photo.



COBWEBS in remote corners. They don't even get a chance to start now that Fuchs' program has made workers allergic to such neglect.

Meat Packer Produces

BEEF "COCKTAIL"

New process solves flavor and suspension problems of liquid meat product. Highly palatable and nutritious, drink has many consumer appeals

NED DRAUDT
Research Food Technologist, Kingan & Co., Indianapolis, Ind.

IN QUEST of functional new products, management at Kingan & Co. presented our research and development laboratory with a unique idea:

"Why not come up with a liquid meat-base food, or "cocktail," that combines flavor appeal with excellent nutritional properties?"

Our first reaction was not overly optimistic. Research showed that complete, and even partial, hydrolysates of protein displayed a marked loss of natural meat flavor. Further, the loss of amino acids in the hydrolysate process definitely reduced nutritional value.

But the idea, and its possibilities, intrigued us. So we set to work.

Today—after a full-scale consumer evaluation in local marketing areas—we believe that our newly developed "meat cocktail" is ready for widespread commercialization. Labeled "King's Fare," the product consists of a sterile, homogeneous liquid composed of meat and vegetables, sealed in a conventional 15-oz. can. It has tomato-juice consistency and light meat-gravy color. Among its inherent advantages are these:

- **Flavor retention closely approximating that of cooked quality meat.**
- **Protein content per can in the range of one-third of man's daily need.**
- **Low caloric value—250-300 per can—suggesting ideal dietetic qualities.**
- **A satiating effect which should appeal to overindulgent eaters.**

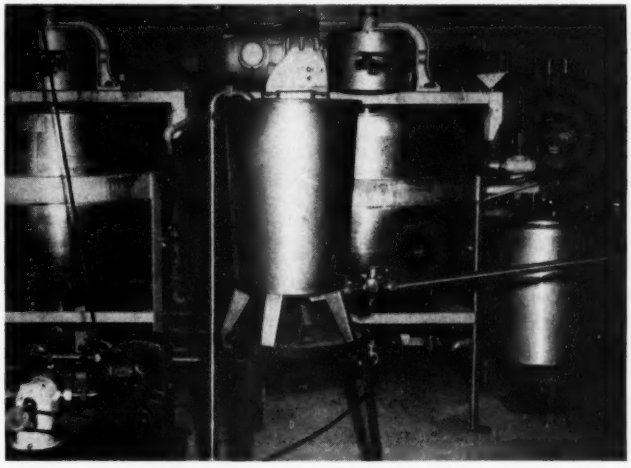
In our development work, we had two basic objectives. First, the product should be completely liquid and sufficiently fluid for drinking. Second, the meat should be so processed that little damage would be done to its natural flavor and nutritional values.

Essentially, we solved both objectives by particle-size reduction. Use of a comminuter and subsequent violent blending and dispersion produce fine meat particles. These operations accomplish the function of permanently suspending meat and other ingredient particles in a liquid having a very acceptable consistency.

It should be pointed out, however, that the basic size-reduction operations are not the whole answer to making this fairly involved product. Other, more subtle technics were developed to make the process successful—particularly those having to do with the difficult problem of flavor retention.

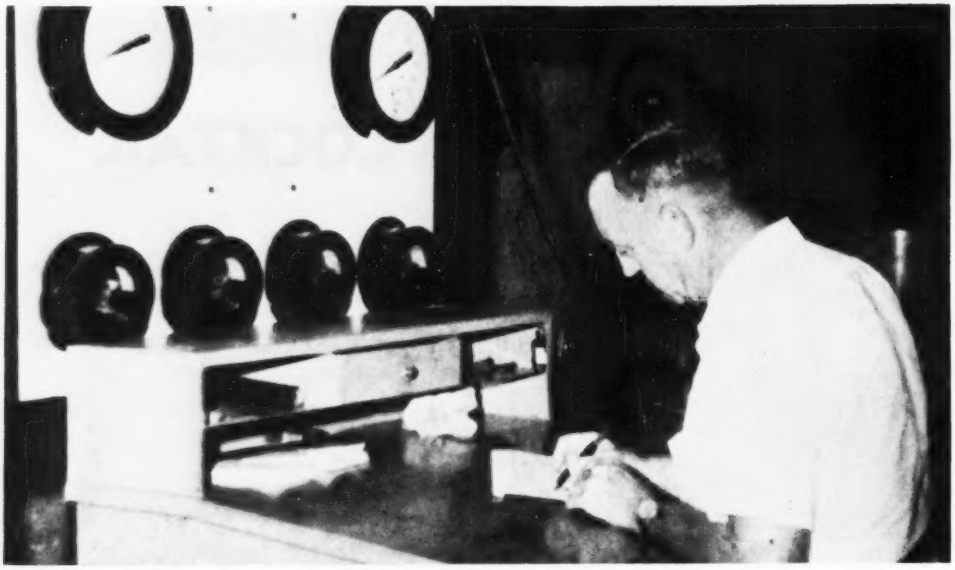
At present, our new process is set up in semi-commercial size in a sec-

(*Turn to* page 150)



COMPACT PROCESS uses dairy-type equipment. Comminuter (center) reduces kettle-cooked ingredients to fine suspension.

Jotting the readings and calculations . . .



HERE, panel-instrument readings are logged and checked by Superintendent of Refrigeration George Cook.

Profit in Pinning Freezing Costs

"Dollars and sense" of it demonstrated at Clinton's Dunedin citrus concentrate plant—which KO'd inefficiency with this fast one-two:

1. Putting in new top-performance refrigerating equipment
2. Following up with a sharp figuring system that simply and quickly determines the basic charges for constantly "yardsticking" the operation

D. K. CHAPMAN
Regional Service Engineer, Worthington Corp., Atlanta, Ga.

A food processor's installation of outstanding and advanced-performance equipment is a full story on its own. **It's even more than that, however, when the processor goes on to develop special yardsticks enabling unique high scores in efficiency from the new equipment.**

Clinton Foods' Juice Industries plant at Dunedin, Fla., has done just that.

It put in an ultra-modern freezing plant utilizing new type tunnels, and thus minimized refrigeration costs, upped production, and reduced manpower needs. Then it worked out a system to pin down common denominator costs of freezing a pound of concentrate, thus deriving essential computations that now pay big in top-efficient guidance of the whole operation.

The key role played here by the refrigeration system is evident when it is noted that this facility is set up to deliver 800 6-oz. cans of Snow Crop frozen concentrate every minute. Today, the system is as free from costly shut-downs as possible.

The new company-designed freezing tunnels replaced the old type freezer rooms where wagons loaded with racks of canned juice were pushed in by hand—a much slower operation that lengthened freezing time.

In the new tunnels, a −25deg. F. temperature is maintained, and the arrangement is for continuous operation, with no need to stop the units even for defrosting. Efficiency is emphasized in the refrigeration layout, and there is an ample supply of cooling water (meaning low head pressure), with correspondingly low power consumption.

Through benefits of the system, costs of other processing phases have been cut as freezing time has been reduced and needs for manpower lowered. The operations of the section of the plant delivering raw fresh juice to the first step in concentrating, and subsequent freezing and storing, have been materially improved due to the stepped-up capacity.

Getting Down to Costs

In the basic analysis of any such refrigerating operation, the major question must be grappled: "What does it cost to remove a Btu. from the product?" It is essential to know just how much each pertinent step

. . . gives full score on operations

DAILY REFRIGERATION REPORT

McDONALD DIVISION *Juice Ind. Division*
CLINTON FOODS INC.
DATE 12-1-51

TIME	HIGH STAGE COMPRESSOR 1	2	3	4	5	6	7	8	9	10	BOOSTER COMP. 1	2	3	4	5	Cold Stor. Suction	Tun. Suction	Inter-mediate Pres.	Cond-enser Pres.	Suct. Whs.	Brine on: C. Stor.	Inter.	Con. Water In	Temp Out	Dry Bulb	Wet Bulb	% Rel. Humdy.	Temp. Cans 1-Tun.	2-Tun.
7 A.M.	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		6 lb.	6 V	25 lb	160 lb.		✓		77°	86°	75°	72°	85½	-16	-16
8	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		6 "	4 "	25 "	160 "		✓		76	85	75	72	85½		
9	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		7 "	8 "	26 "	160 "		✓		75	84	72	70	90		
10	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		6 "	6 "	24 "	160 "		✓		75	84	73	71	90	-16	-16
11	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		7 "	5 "	25 "	160 "		✓		79	87	76	72	81		
12	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		7 "	7 "	27 "	160 "		✓		79	88	77	72	71½		
1 PM	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		7 "	6 "	23 "	160 "		✓		76	85	77	71	73½	-15	-16
2	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		7 "	6 "	24 "	160 "		✓		78	87	79	73	74		
3	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		6 "	6 "	26 "	160 "		✓		77	86	78	73	78		
10	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		7 "	7 "	29 "	160 "		✓		77	87	79	73	70		
11	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		8 "	8 "	25 "	165 "		✓		76	84	76	73	86		
12	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		6 "	8 "	25 "	155 "		✓		76	84	74	72	90		
1 A.M.	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓		6 "	6 "	26 "	155 "		✓		78	86	74	71	85	-14	-15
2	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		6 "	6 "	24 "	155 "		✓		77	86	70	68	90		
3	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		6 "	5 "	25 "	155 "		✓		77	85	70	69	95		
4	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		6 "	4 "	26 "	160 "		✓		76	84	70	69	95		
5	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓		6 "	6 "	25 "	160 "		✓		76	84	69	68	95		
6	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓		6 "	6 "	25 "	160 "		✓		76	83	69	68	95	-16	-16
AVERAGE	24	24	24	24	24	24	6	18			24	24	24	24		6.5 "	6 "	25 "	160 "		24							-15	-15.5

OPERATOR'S SIGNATURE 1st SHIFT 2nd SHIFT
REMARKS:

LOG SHOWS hour-by-hour data on refrigerating components, thus efficiency and cost are quickly checked.

costs if greatest profitable efficiency is to be realized.

Clinton has gone after the all-important cost figures by use of a daily log sheet covering its refrigeration plant operation. This log provides all the pertinent data, such as pressures, relative humidity, temperatures including those of cans entering and leaving the tunnels, and the length of time each compressor is run.

From these and other figures on the sheet, the total tonnage of refrigeration delivered and the total hp. per ton can be computed.

By breaking down the production record into lb. per hr. of product cooled, the total Btu. per lb. required to freeze the concentrate can be determined. This log sheet can also be utilized in computing the kw-hr. used to finally rate the actual total cost in dollars and cents. The log sheet will show just what it cost to remove the heat from the product at any stage of production.

How Log Sheet Works

One of the main uses of the log is to provide a daily comparison, or check, on the Btu. per lb. required to freeze and store the product and to determine the hp. per ton of refrigeration required. This figure may vary slightly from day to day due to differing operating conditions, and allowances are, therefore, made accordingly.

The daily log sheet shows at once if the refrigeration requirements to freeze a given batch of concentrate are climbing above normal. If so, an investigation is begun to determine the cause of the inefficiency and restore the log readings to normal.

Let us take a typical log sheet and follow through on a day's operation to see just how the cost is determined. All of the entries are not needed to determine the cost. Some are there for comparison against figures established as normal.

Hours and Pressures

Figures needed in determining cost are the number of hours of operation for each size compressor, and the suction and discharge pressures under which these units were operating. This information is used, in conjunction with the manufacturer's rating tables, in arriving at the total hp. Then, by application of a factor (explained later) the total cost in dollars and cents is determined.

Operating data is entered on the sheet each hour. In the columns covering the high-stage compressors and booster compressors, the check mark means that the unit was in operation. In the column "Brine On," checks under "Cold Storage" mean that 0-deg. brine was needed that day, and the brine shell and the tube cooler were connected to the suction line of the cold storage rooms.

The wet and dry bulb and relative humidity readings were entered because that day the spray pond for condensing water was being used. The last two columns on the right are for recording the temperature of the concentrate as it leaves the tunnels.

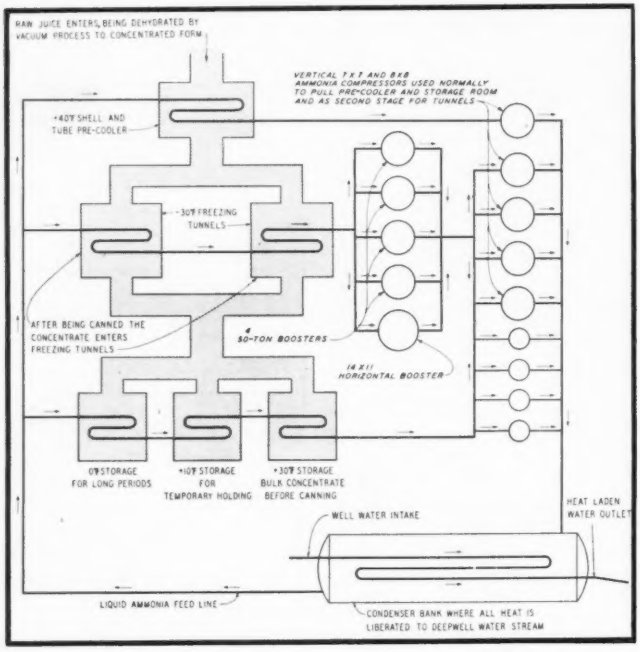
Now for the actual method of arriving at the cost: First, the production record is obtained for that particular 24-hr. period, which in this case was 350,349 lb. of frozen concentrate, or 14,597.8 lb. per hr. Each compressor is numbered and, by averaging the suction and condensing pressures, we find that No. 1, 2, and 3 second-stage compressors (two 9 x 9, and one 7 x 7) operated 24-hr. at an average of 6.5 hr. suction pressure and 160 lb. discharge pressure.

Tables Show Tonnage

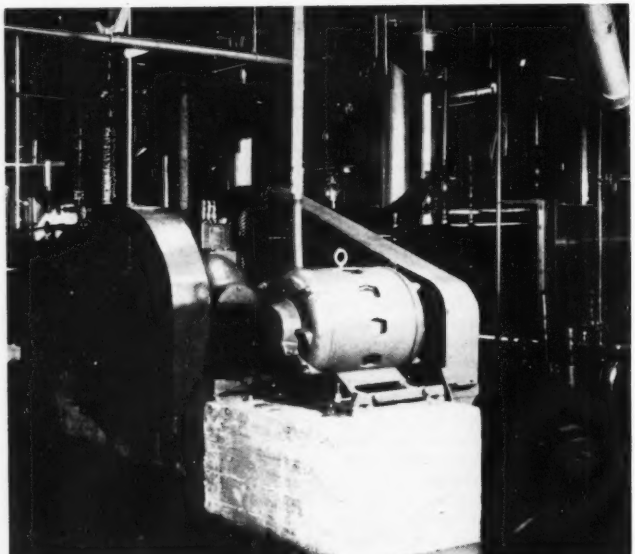
Reference to the Worthington capacity tables for the particular compressors then shows that under these operating conditions a total of 75.34 tons of refrigeration was supplied per hr. at 1.94 bhp. per ton. Multiplying 1.94 bhp. per ton x 75.34 tons x 24 hr. equals 3507.8 hp. total for 24 hr. on storage rooms and brine cooler.

Referring again to the log sheet, we see that for the high stage opera-

Tunnel and compressor system . . .


RAW JUICE ENTERS, BEING DEHYDRATED BY VACUUM PROCESS TO CONCENTRATED FORM
VERTICAL 7 X 7 AND 8 X 8 AMMONIA COMPRESSORS USED NORMALLY TO PULL PRE-COOLER AND STORAGE ROOM AND AS SECOND STAGE FOR TUNNELS
+40° SHELL AND TUBE PRE-COOLER
-30° FREEZING TUNNELS
AFTER BEING CANNED THE CONCENTRATE ENTERS FREEZING TUNNELS
4 50-TON BOOSTERS
14 X 11 HORIZONTAL BOOSTER
0° STORAGE FOR LONG PERIODS
+10° STORAGE FOR TEMPORARY HOLDING
+30° STORAGE BULK CONCENTRATE BEFORE CANNING
WELL WATER INTAKE
HEAT LADEN WATER OUTLET
LIQUID AMMONIA FEED LINE
CONDENSER BANK WHERE ALL HEAT IS LIBERATED TO DEEPWELL WATER STREAM

. . . and closeup of booster



HOW cans of juice are chilled. Top: Plan depicts flow of heat from freezing tunnels and cold storage rooms (shaded areas) via refrigeration lines and equipment. Above: This 14 x 11 booster, driven by a 75-hp. motor, is used on tunnel. In background are seen condensers and receivers, suction traps, oil separators, and desuperheaters.

tion there were also two 7 x 7, and one 8 x 8 compressor running 24 hr., one 7 x 7 running 6 hr., and also another 9 x 9 running 18 hr. These were operated at an average of 25 lb. suction pressure, which is shown in the column "Intermediate Pressure" (since this column registers the suction pressures of the compressors used as second-stage units for the boosters). The head pressure is again 160 lb. since all compressors run under the same head pressure and discharge into the same bank of condensers.

Again by checking the capacity tables, we learn that these particular compressors were delivering 167.44 tons at 1.22 bhp. per ton, which figure multiplied by 24 hr. equals 4,902.6 hp.-hr. Multiplying 167.44 tons x 12,000 Btu. per hr. and dividing by the 14,597.8 lb. per hr. production for this day gives 137.6 Btu. per lb.

Booster Calculations

Once again referring to the log sheet, we note that No. 1, 2, 3, and 4 booster compressors were operating 24 hr. on the freezing tunnels. By averaging, we find the booster suction pressure to be 6 in. vacuum (11.71 lb. absolute or −36 deg. refrigerant). The intermediate pressure, although the suction for the high stage is the discharge for the boosters, we found to be 25 psig. average, or 40 lb. absolute.

Looking again at the capacity tables, it will be determined that under these conditions the boosters had a total capacity of 1,267 cfm. ammonia vapor, with .368 lb. liquid per min. per ton circulated and 22.27 cu. ft. vapor per lb. of liquid. Now, .368 x 22.27 equals 8.19 cfm. per ton. We now divide 1,267 total cfm. by 8.19 cfm. per ton and arrive at 154.7 tons.

For additional information, 154.7 tons x 12,000 Btu. per hr. divided by the 14,597.8 lb. total product for that day equals 127.1 Btu. per lb. required for the booster capacity. The booster hp. per ton is shown in the data tables to be .96. Multiplying .96 x 154.7 tons x 24 hr. gives us 3,564.28 total hp. for the 24 hr. period required for the boosters.

In the booster calculation we saw that 127.1 Btu. per lb. was required to freeze the concentrate, although the high stage circulations show 137.6 Btu. per lb. The difference in these two readings, obviously covering the same work, is because of the additional work required for desuperheating and sub-cooling, since there are desuperheaters on the booster discharge. In other words, the 137.6 Btu. per lb. is the total removal capacity required, including the product load, desuperheating, sub-cooling, and all losses of every nature.

This Btu. per lb. requirement will vary from day to day due to atmospheric conditions, size of cans, and volume of product being run. On this particular day there is only a difference of 12.7 tons, the amount required for desuperheating and subcooling. On some days, when the production load is heavier and the condensing pressure higher, this figure will increase.

We will now add the total hp. required for the different stages. The tunnel booster compressors required 3,564.28 hp. The high stage needed 4,902.6 hp., and the cold storage and brine 3,507.8 hp. This totals 11,974.68 hp. However, this is not the actual true hp. consumed, since there are certain losses.

Cost Calculations Simplified

Computations are necessary involving power factor, motor efficiency, etc. But a simple method has been devised whereby multiplication of the indicated hp. by 1c. gives the actual cost. Applied in the case of this typical log sheet, we get $119.74 for current cost used by the compressors.

This is a fairly accurate figure and is satisfactory for the company's purposes. The current consumed by the auxiliary equipment, such as fan motor, pump motors, etc., remains constant from day to day, and the cost can be easily established as a fixed figure. Only the compressor motors vary in consumption.

The company generates a portion of its own current with one 1,250-kw. Worthington steam turbine operating non-condensing to furnish process steam. Balance of electrical power needed is purchased from the Florida Power Corp.

If we divide the $119.74 for current consumed by the compressors by 350,349 lb. of concentrate frozen in 24 hr. we find that it cost approximately .00034c. per lb. for compressor expense to freeze and store. Now, if all the other motors, such as unit fan motors, pump motors, conveyor motors, etc., are added in, it raises the cost per lb. to a total of .0004c.—indicative of an efficient operation.

An accompanying drawing illustrates the refrigeration cycles' removal of heat, or the heat flows of Btu. away from the product. After the juice is extracted, it goes to the evaporators. Here, water removal from the juice begins. This is done by pulling a very high vacuum over the juice and by a series of re-cycling.

Water is taken from the juice until it is down to a concentration point that requires three parts water to restore juice to its original state for drinking. Concentrated juice leaving the last evaporator is circulated through shell and tube chillers. These units cool it down to 40 deg. F. Brine is used as the cooling agent.

Can Drying Vital

The cool juice naturally causes condensation on the cans. Further, the cans also go through a washer before entering the freezing tunnel. Thus, droplets of water are clinging to them as they enter the freezer.

If left on them, this water would freeze into hard lumps and hinder packing. But the moisture is removed by a very neat trick—regulation of the first section of the tunnel so that it operates at a higher temperature and lower relative humidity than the rest of the tunnel.

Under this condition, moisture is simply soaked up by the dry air passed through at high velocity, and by the time the cans reach the −25 deg. section they are dry.

The latter section is separated from the former by a plywood portion. The opening between the two is just large enough to let the cans on the conveyor belt pass through.

Tunnels Described

There are two tunnels, designed and built by the owners, which receive juice at 40 deg. F. and deliver it at the end ready for packing at −6 deg. Each tunnel has a capacity of 9,000 lb. per hr. of concentrate. When working at full capacity, each delivers over 400 6-oz. cans per min. Shut down of the filling equipment for clean-up and code-changes accounts for the difference.

Cooling equipment in the two tunnels differs. One tunnel has six large blowers delivering a total of 96,000 cfm. and having a total evaporator capacity of 80 tons. "No Frost" solution is used on the coils.

The second tunnel is equipped with 50 individual blower coils—100,000 cfm. and 135 tons. Coils in this tunnel use a water defrost. Total capacity of the two tunnels is 215 tons.

An interesting feature of this system is the hook-up of the evaporators. In each tunnel, evaporators are connected so that those in the first section, where the cans are dried, are connected to the suction line of the high stage compressors. However, the ammonia for all evaporators enters the surge drum for this first group of evaporators, thereby removing a great part of the flash gas with the high stage compressors instead of having it pass on to the boosters.

This arrangement also acts as a liquid precooler for the ammonia feeding the colder evaporators in the freezing section of the tunnel. Here, liquid is taken from the surge drum of the first group at about the same temperature under which the evaporators in the first group are operating, or about 11 deg. F.

Liquid is fed to the colder evaporators in the freezing section through a 2-in. line which passes inside the tunnel. Therefore, no heat pickup is encountered. This accounts for the fact that the liquid enters the colder evaporators at the same temperature of the suction gas from the evaporators in the first section of the tunnel.

The liquid feeding the colder evaporators is controlled by pilot-operated valves, which in turn are regulated by a float in the surge drum. There is only about 28 lb. pressure drop across the expansion valves. Suction pressure of the colder evaporators is about 6 in. of vacuum and the pressure of the liquid entering only about 25 lb. (corresponding to the 11 deg. F. of the suction gas in the first section). The valve has been sized enough to take care of the load at this low pressure differential.

One can readily see the saving in operating cost by hookups of this nature wherein head pressures are held to a minimum. The evaporators in both tunnels are arranged so that by the use of line valves small groups of evaporators can be shut off for defrosting without interrupting the operation of the tunnel, but merely raising the temperature slightly.

Storage Facilities

There are four storage rooms. Their dimensions, in feet of length, width and height are: (1) 80 x 80 x 20, (2) 95 x 118 x 20, (3) 120 x 160 x 20, and (4) 80 x 80 x 20. The fourth room is held at 35 deg. F., whereas the first three are kept at −10 deg. Capacity is 600,000 cases of finished product.

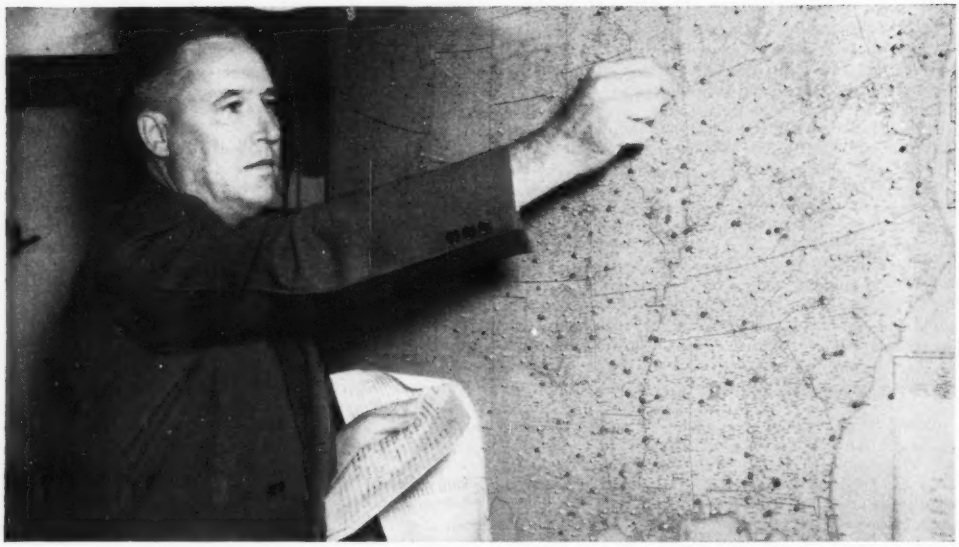
There are 48 6-oz. cans to the case, or about 29 million cans stored. Two of the −10 deg. rooms are each equipped with four brine spray units using a float controlled, "No Frost" solution. Cooler capacity is about 48,000 cfm. for each of these rooms.

The third room has a water defrost system. Here, cooler capacity is about 44,000 cfm. And there are 22 separate coils all connected to a common surge drum with float control.

The 35-deg.-above room has two blowers handling 12,000 cfm. each. These are float controlled with a back pressure control valve and thermostat arrangement which enables them to be set for an automatic defrosting cycle. The storage rooms represent a total of 100 tons connected load.

(*Turn to page* 168)

Director maps national performance . . .



HUNDREDS OF PLANTS are tabbed for beverage quality by Field Service Director P. C. Otts. Colors of pins show product ratings: Silver, 100; yellow, 90-99; green, 80-89; black, below 79. Red pins denote yeast in beverage.

"*Consulting*" Field Control Assures Top-Quality Beverage

By practically cooperating—instead of monitoring—roving technicians help bottlers keep Dr. Pepper "right", also promote advanced technics and augment sanitation . . . Home-office experts "anchor" efficient program

FE STAFF

Keeping product quality on the beam—even in one plant—is an exacting job. It demands a persevering eye on equipment upkeep, sanitation, and raw materials. And it calls for worker cooperation, test-tube to tow-truck.

So getting a uniform beverage *from over 400 widely scattered and independently run sources* might seem like an impossible task—a multiplication of a tough one-plant job almost defying accomplishment.

Yet Dr. Pepper, through a program of "applied consultation" carried out by a staff of roving technicians, not only has this situation in hand at all times, but consistently gets results which are surprisingly rewarding.

For the company field men are production specialists first and salesmen even before that. And by "selling" new technics and better sanitation, a nation-wide bottling-plant performance is achieved that could never be enforced by a "you do it or else" policy.

Dr. Pepper quality control, then, relies on a field program that might be called "constructively undogmatic." Some of its overall high points are—

- **Visits by field specialists to each plant averaging four yearly.**
- **Complete home-office lab analysis of bottlers' products twice a month.**
- **Yearly technical forums to keep field men "on top" of industry advances.**
- **Untiring aid to any bottler facing a serious production problem.**

First, let's take a look at this field group and see how it functions.

Seven technicians are assigned to as many territories throughout the United States. This gives each man an average of 55 plants to cover. And he's expected to make at least four visits per bottler each year.

Sanitary Engineering Stressed

Field men are selected on the basis of their bottling plant experience and then get special training in Dallas in all phases of production and laboratory control. Greatest stress in the training program, however, is on mechanical aspects of bottling and in-plant sanitation. This latter specialization—sanitary engineering—has particularly paid off. For the spot field calls involve advice on sanitation more often than any other problem.

All mobile technicians are equipped

with a company car and a specially fitted kit for in-plant tests. Itineraries are planned for one or two-week trips by the home office so that routing can be made to include specific plants with urgent problems.

During his scheduled 4-a-year calls, the field man uses a minimum of about 4 hr. for routine tests. Then, if no special problems deter, he has enough afternoon time to drive on to the next franchised bottler. But should a specific puzzle necessitate it, he is ready to spend several days at one plant—with work 'round-the-clock if required.

Experience and acquaintance in the field are assets of workers of this type. Bottlers cooperate more fully with a man they have long known and can depend upon. The company is proud of the 95 years of total field service of its group—an average of 13 years of experience per man.

Primarily Advisory

It must be emphasized that periodic visits by field men are not considered as "check-ups" but are primarily advisory in nature. Thus, should there be some deviation from the norm,* these men are available to advise how to get back on the track. In this cooperative approach, the field men always announce their arrival directly to the owner or plant manager and secure his approval to enter the plant and make tests.

The roving specialist is always as welcome, the company believes, as is a topnotch salesman. For he usually brings with him facts and even concrete samples of new technics or products that have been thoroughly evaluated in the Dallas bottling plant—an example would be an advanced carbon dioxide filter that he'd have stowed in his kit. And he will help the bottler order his innovation if wanted.

Annual Technical Forum

To keep the field force and other company production men on their toes and "in the know", a week's technical forum is held at the start of every year. In this meeting the best talent of various machinery and supply firms give talks and demonstrations on new units and technics developed over the past several months.

In addition, these visiting engineers answer a long series of questions (involving their specialty) submitted by field men, who have plenty of opportunity to come up with good ones in a year's time. After the meeting all question and answers plus illustrated talks by the experts are bound into volumes and distributed.

Programs of annual technical meetings are carefully rotated as to subject matter. Thus, after several years, a key topic is re-aired for new developments.

In 1951, emphasis was on bottle washing mechanics, washing compounds, and bottle manufacture. This year the spotlight was on filler machinery, closing units, and aspects of the actual crown itself.

After the technical meeting, field men attend a 3-day vending machine school which gives them basic information on the various units and provides simple maintenance training which they can, in turn, pass along to the franchise bottlers' vending salesmen.

FIELD MAN checks bottling plant, then reports findings to Dallas. He uses Cl comparator, pressure tester, CO_2 gage, hydrometer, water test kit.

In-Plant Tests

During periodic plant visits, the field technician makes routine checks —using his testing equipment—on the water supply, product quality, and bottle washer solutions. Also, a sanitary survey is made of the entire premises. Included in his routine are the following specific procedures:

1. *Water alkalinity test.* A titration involving .1 N acid and M-indicator. Then a reddish tint shows the water to be at the neutral point. This provides a simple way to estimate the amount of lime needed to remove alkalinity in water treatment.

2. *Chlorine concentration in water.* A comparison test using the Hellige Comparator (a small Bakelite unit holding two test tubes and a rotating viewing-lens). Water to be tested is colored by a reagent and compared to a known chemically treated water. Dr. Pepper recommends from 6 to 10 ppm. chlorine in bottling water to destroy organisms that might have been carried by air and dust into the treating tank.

3. *Percentage of caustic in bottle washing equipment.* A colorimetric procedure using the standard tablets of the American Bottlers of Carbonated Beverages. Solution strength is determined by the number of tablets needed to turn it lemon yellow. The company recommends 2.5 to 3.0 percent caustic in the solution and a minimum of 5 min. soaking at 130 deg. F.

4. *Caustic carry-over in washed bottles.* A colorimetric check using a few drops of phenolphthalein on the outer and inner surfaces of the bottle. A pink color indicates carry-over, but the result should be checked against the untreated local water, which may be slightly alkaline.

5. *Check on beverage carbonation.* A volume determination involving a hollow bottle-cap piercer attached to a pressure gage. When the cap is punctured, air is first released through a

* Established practice is detailed in the *Dr. Pepper Production Control Manual*, which is periodically revised and issued to the bottlers.

stopcock. Then the bottle is shaken and carbon dioxide pressure read on the dial, following which the temperature is checked and correlated to volume using a special table. Dr. Pepper standard is a gas volume of 3.5 to 3.7.

6. *Syrup weight of beverage.* A specific gravity measurement using a Brix hydrometer with a built-in thermometer for temperature compensation. Gas is removed from the liquid before making the test. Desired standard here is 10.8 plus or minus .3 deg. Brix.

Many other observations are made in addition to these specific tests. For example, the carbon dioxide gas supply is checked—usually at its filter or drum—for oil and foreign odors. Also, a testing unit is carried by the field men for use in case the plant manager would like his pressure gages checked.

Behind This Field Service

—is the efficient, modern headquarters plant at Dallas, whose advanced operations have already been recounted in the first two articles of this special three-part series.

For details of the planning and implementation that built the Dr. Pepper Co., see "Big Beverage Success," page 101, Feb. FE.

And for a revealing description of the continuous syrup-making operation, see "Modern Units Keyed for Functional Flow Make Quality Syrup En Masse," page 96, Apr. FE.

Besides tests and technical observations, an all-important appraisal of the finished product is also made. First, bottled Dr. Pepper is checked for proper fill—2 in. from the top of bottle is standard. Then the bottle's contents are inspected for sedimentation or suspended particles. And finally the bottle is opened and the beverage tested, followed by a similar taste-check at some of the local trade outlets.

Home Office Appraisal

Results of all routine tests are tabulated by the Dr. Pepper field man on a company *Field Production Work Sheet*. Also included on this form is a complete visual survey of the building and premises, indicating the need for cleaning, sterilizing, or painting at any location. And space is available for

(*Turn to page 219*)

Home Office Lab Maintains Continuous Control

NATIONWIDE sampling system routes filled bottles from each plant to home office twice a month. Here, they are tested for such characteristics as color, turbidity, filling point, gas volume, Brix, pH, yeast count, and taste.

SPECTROPHOTOMETER provides quick check for aluminum, also evaluates color and turbidity in samples. Unit on left is a Neffuoro-Photometer, which is used to measure turbidity **or colloidal** matter in water samples.

COLOR COMPARISON on this home-rigged tester is an important check on uniformity of the beverage.

CARTONS for samples are mailed out regularly to franchise bottlers all over the country.

COMPACT PLANT, occupying only 1 acre with 100,000 sq. ft. of floor space, has same through-put as former million-footer on 13 acres. The new high performance features many mechanization economies.

They've Got *Tomorrow's* Efficiency *Today* in This—

Production-Planned Plant

New Wilson packinghouse handles full through-put in but one-tenth former space at striking savings in time and inventory. Management "tailored" it by teaming advanced technology and latest engineering

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

Jot down a list of all the top-efficiency features embodied in Wilson & Co.'s new Kansas City plant—and you come pretty close to having the meat-process engineer's "blueprint" of the packinghouse of the future.

Just recently put in full-scale operation, this functional-design facility is notable in achieving striking flexible compactness under a single roof. It was specially conceived and built on advanced engineering lines to streamline packing performance for service to the regional market.

Small wonder that Wilson's management has a critical and expectant eye trained on Kansas City. It's certain, too, that other planners in the industry are also more than casually interested in gaging the pace this new operation will set.

All On One Acre

A comparison of the new plant with the one it superseded most graphically reveals the strides that have been made.

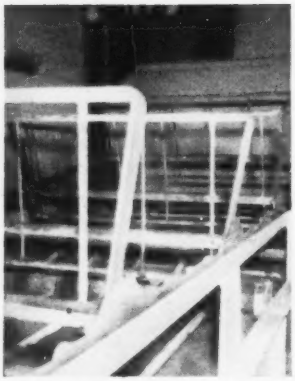
The former Kansas City plant—typical of many packing layouts that "just grew like Topsy"—comprised a central nine-story structure and several outlying buildings, all occupying more than a million square feet of floor space stretched over 13 acres.

The same through-put in dressed beef, pork, and pork products is achieved today in only 1/10th of that floor space in a two-story building located on a single acre!

Other economies are equally dramatic. Only one small engine room and two modern boilers in the new building serve operations formerly requiring three sizable engine rooms and two boiler-rooms. Two compact electrically driven compressors provide adequate refrigeration, taking the place of eight steam-driven flywheel units in the old location. Dual banks of seven air-conditioned smokehouses —all on one floor—replace two huge multi-story buildings. Moreover, only one elevator is needed, whereas 24 served the old plant.

Four-Point Program

How were such efficiencies accomplished? Wilson planning engineers like to say that the new plant is simply an example of what can be done in a typical meat packing operation if ad-



DEHAIRER employs specially designed rotating paddle bars that keep carcasses submerged in tank.

FROM gambreling table (top, rear), carcasses drop onto rail for space-saving haul to singe unit.

ROTATING paddles with metal fingers spin and polish carcasses. Unit is continuous, eliminates hand scrubbing.

vanced engineering is given "free reign". Actually, they admit, four basic ideas guided their thinking:

1. Management's desire for a processing system that would truly coordinate daily production with current sales.

2. The aim to get unimpeded product movement, through straight or U-type processing lines.

3. Belief that manual product handling could be virtually abolished by maximum use of modern materials-handling equipment.

4. Realization that broad space and time savings were possible through employment of the latest innovations in meat-process technology.

Before elaborating on the concrete results of Wilson's four-point program, a brief word about construction and plant design.

Construction Details

Actually, the new facility consists of a modernized and remodeled wing, housing beef operations, plus the main, spanking-new two-story and basement brick building containing all pork, sausage, smoked meat, and by-product manufacture.

Wall space in all processing areas is of tile, finished to ceiling level. And windows are of the large, casement type. Floors are brick where heavy loads are run, and well laid concrete in other locations. Lighting is fluorescent in processing areas where eye work takes place.

The new plant is one of the first in meat packing to employ color dynamics. Interior walls in some areas are of a restful pastel shade, and moving machinery parts have a special, easily identified color. Process piping throughout is also specifically colored.

A particular feature of the new facility is its really commodious dressing and wash-up rooms, which serve 450 employees. Also, a good-sized modern cafeteria is on the premises.

Another non-process area of which the company is justly proud is the central laundering room containing a large institution-type washer and two dryers. Daily, fresh aprons, coveralls, gloves, and hats are chuted to each department.

Meshing With Sales

Perhaps the most unusual aspect of the plant layout—and one of its big space savers—is its absence of cooler storage rooms.

Careful study of marketing conditions in the area over a long period of years suggested that it would be possible to gage daily kill to current sales and thus eliminate need for building up cooler inventory.

Carrying out this philosophy in actual plant operations has been triply rewarding. First, it obviously saves sizable space and refrigeration by eliminating the coolers. Second, it results in much fresher meat, reaching the consumer in better condition. Third, by taking out the dips and peaks caused by "flush" type processing, it offers employees more permanent year-'round work, with subsequent reduction in turnover and upgrading of work quality.

In practice, achieving a plant through-put that is tuned to sales requires astute record keeping and very close daily liaison between the sales managers and production engineering department. Also, each production department head must keep close tab of his going rate and submit periodic reports to central planning.

A result of this elimination of the storage "buffer" has been the creation of a unique specialized talent—planning engineering — which, together with modern statistical methods and office machinery, is injecting a new, calculated precision into plant operations.

One far reaching aspect of planned production—if it spreads as a practice —will be its eventual call for steady and non-speculative livestock supplies.

This practice should bring great gains in the sphere of price stability. In fact, even after a few short months the company reports that savings due to an almost non-existent inventory have pretty much equalled any economies that might have come from speculative buying.

Unidirectional Flow

A brilliant job of functional department-and-equipment layout in the new plant—arranged to speed the product along without sidetrack or detour — makes an easier predictable, controlled through-put. Production moves in one direction from the killing floor through various processes to the packing and shipping room and loading dock.

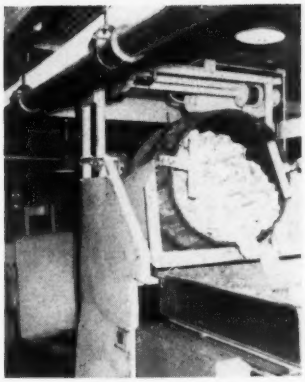
Contrast this with widely scattered operations in the old plant. There, beef kill and coolers were 1½ miles from the boning department. Today, these two locations are in adjoining rooms.

Use of straight or U-type line processing has conserved valuable space as well as transport time. Ingenious use of space begins right at the start of the hog kill. Holding

From Killing Floor to Packaging

PORK CUTTING line includes trimming and wrapping. Band saws along conveyor speed primal cutting.

HAMS and shoulders are skinned with special knives, then chuted to curing department on floor below.



VAT DUMPER discharges a ton of cured product to washing-table conveyor. Fork truck handles vats.

pens are located at street level directly beneath the sticking and bleeding area, where the hogs are hoisted approximately 30 ft. to be dropped onto the sticking rail.

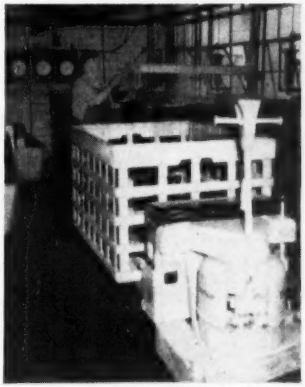
At the end of the sanitary, tiled, sticking corridor, an electric hoist lifts the carcass off the hook and drops it a half-floor level into the scalding tank. From scalder the carcass is routed off 90 deg.– still at the same level–through the dehairer and ends up on an elevated gambreling table from which it is dropped (no need for hoisting) onto a parallel rail serving subsequent processing at street-floor level.

Testifying to the unusual efficiency of carcass movement in killing and dressing is the fact that 150 hogs per hour are handled here in less than 10,000 sq. ft. of floor space–yet with plenty of light, air, and elbow-room to make for good working conditions.

Equally impressive is the engineered line layout in the pork cutting, trimming, and packing department. Formerly, these operations–handling the same 150 hogs per hour–were spread over two floors in two buildings. Now, they take place in a tiled room only 50 by 80 ft. in size.

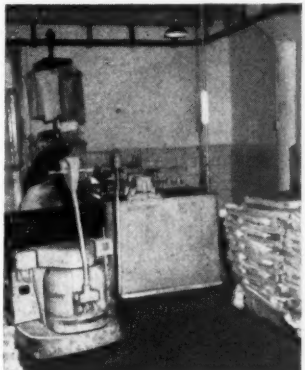
Only one cutting conveyor serves the new operation. Behind the butchers, workers trim the primal cuts. Loins and ribs are immediately wrapped without further handling, and sent to shipping. Hams and shoulders are chuted to the floor below for curing. Trimmed bellies pass under a flattening roll at the end of the conveyor and they are then chuted to the room below for curing.

Beef killing and dressing also feature line flow and space economy. Thirty cattle are killed and processed

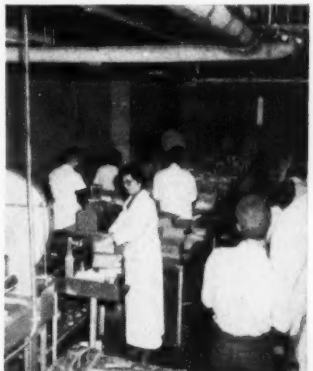


MOTOR TRUCK waits for basket-load of boiled hams, which are being hoisted from cooking vat (rear).

BELLIES are automatically skinned at a rate of one every 4 sec. Curing and smoking then follow.



FROM the bacon press (background), bellies are loaded on pallets and next trucked to adjacent slicing room.



BACON packaging lines are fed by two high-speed slicers. Overwrap machines handle 3,000 lb. hourly.

per hour in one hour. Here, the carcass is skinned, hoisted onto a rail, and fed onto an automatic chain conveyor for dressing. Use of automatic carcass moving—rare in a beef operation of this size—is an indication of how completely the planners were able to bring mechanization benefits in the plant.

Variety of Movers

Inherent in the function of this pace-setting plant is the use of modern materials handling. Power trucks, monorails, hoists, loaders, and unloaders are all put to work. Needless to say, this engineered product-moving system is also important in getting planned production.

Heart of the handling system is a group of ten Automatic Transport power trucks, each capable of lifting 4,000 lb. These trucks travel in specially designed alleyways and routes, and they have served to eliminate some of the most tedious manual jobs.

Incidentally, the fairly large number of trucks serving this compact plant allows movement of single vats, carts, and trays. Naturally, the long "trains" in use elsewhere could not be employed in so small a working area.

It is interesting to note that the flexibility of unit movement over train movement is expected to save enough to pay for the extra movers in short order.

One good example of power-moving economy is in the curing cellar. Normally, the 2,200-lb. curing vats have to be manually emptied into trucks and the product carted to the smokehouse for re-locating, by hand, onto a washing and hanging conveyor. This meant a few thousand tosses of a "hook" per vat and an equal amount of damage to products.

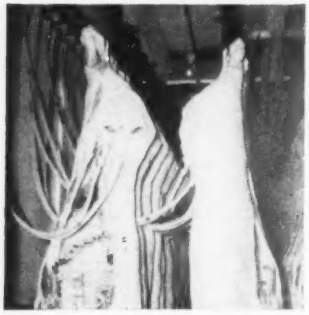
Today, a power truck simply picks up the full vat and totes it to a dumper. The latter then rolls the product out onto a conveyor feeding a continuous washer. Here, the discharge table levels-in with the branches of rail-borne trees moving up to the smokehouse floor.

A similar burden has been removed in the movement of ham molds. Hams are now loaded into an adjacent iron basket at the stuffing table. The loaded basket is then hauled to boiling vats by a motorized truck. An overhead beam hoist next picks up the basket and sets it in the vat. The same rig does the unloading at the end of the cook.

Delays and strains in moving product to and from smoking and cooling rooms have been solved by the powered monorail transport system, company designed, which networks the plant. Bellies, for example, never leave the hanger until they are pressed and sent to the slicing room.

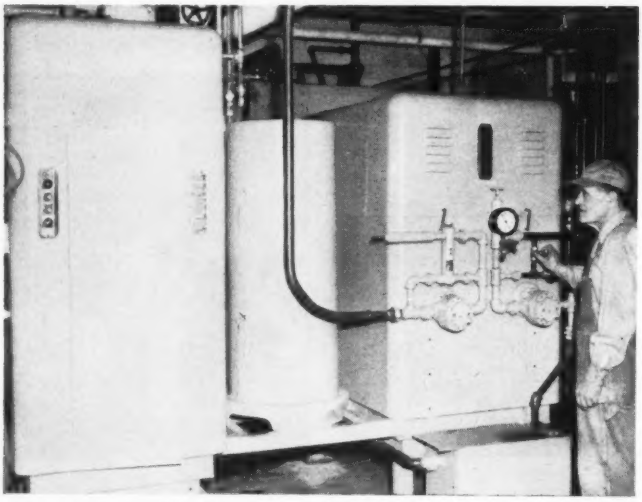
At the present time, the company is setting up a new department for processing animal and poultry feed. This is projected to use advanced handling technics. Raw materials will come to the process by screw conveyor and bucket elevator from various parts of the plant. Movement in the process itself will be expedited by a Payloader and fork lift truck.

Other Special Engineering



CHILLED BRINE, fed through hoses and injection needles, quickly cools carcasses and improves flavor.

HIDE-CURING takes place overnight in this circular, concrete brine tank equipped with agitators.



VOTATOR processing equipment quickly and continuously texturizes lard.

Process Advances

Meat-process technology has spurted ahead in the past five years, and Wilson has taken the opportunity to exploit just about every promising technic "from the ground up."

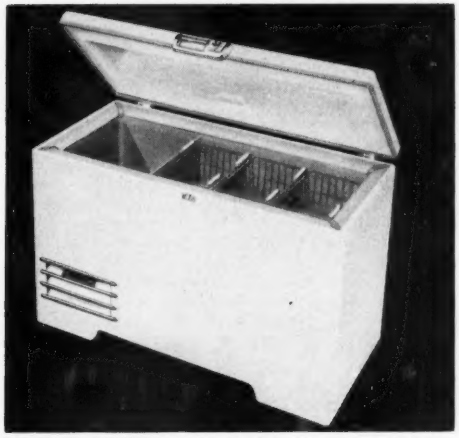
Smoking efficiency has been boosted and through-put speeded by installation of 14 Julian air-conditioned smokehouses equipped with Taylor automatic control systems. These compact stainless steel units—each with its own individually controlled smoke generator—have about halved smoking time for many products. At the same time, they have assured a consistent product "eye-appeal" rarely equalled in the old multi-story houses.

The company's recently improved quick hide-curing process is also saving time and space in the cellar of the new facility. A circular concrete tank, fed with automatically concentrated brine, holds and agitates the hides from each day's slaughter in an overnight treatment. The following morning, hides are stacked and shipped to the tanners.

(*Turn to page 219*)

Two Issues: **Low-priced lines and . . .** **. . . wholesale plan to fill home freezer**

NEW priced-down packages pose leading question. Many fear repetition of factors that set field back in '46.



SOME home units are now sold to include direct food service at lower rate, circumventing retailer.

QUICK FREEZING GAINS

—Both in Volume and in Headaches

Sales up—spearheaded by juice concentrates, poultry, and seafoods . . . B-grades and wholesaler-to-consumer sales spur controversy . . . Retailer remains bottleneck

UP AND UP go the frozen-food production totals. Since 1947, output records have been broken one after another. The facts and figures—see table, next page—show the broad swing of the climb, and no level-off is in sight.

Yet some in the field are viewing certain developments and problems with apprehension. Reasons:

▶ **The influx of lower-priced, second-grade lines. . . Possible effect of new home-freezer food services on the total field. . . The cabinet-space bottleneck at retail level. . . And transportation and warehousing difficulties.**

High in the speculative spotlight is the controversial matter of B-grade frozen foods. In the last year, frozen-food packaging has become a two-grade operation. Consumers who have come to expect the highest quality in these products are now faced with a choice.

Placing this type of food on the market reminds many of the debacle of '46. However, others see the lower-priced items as high volume builders.

When the end of World War II brought relaxation of food rationing, a tremendous demand for frozen foods was foreseen. To meet this expected demand, many newcomers put inferior-grade frozen foods on the market.

The reaction hit in 1946. Prices tumbled. There were heavy losses in inventory and investments. Many small, legitimate concerns were forced out of business. And larger concerns were set back substantially. The list of over 1,000 packers dropped to less than a few hundred in 1947.

Today, some see an omen of similar difficulties in the recent market appearance of B-grade items. They argue that only one factor is responsible for the industry's recoup since 1946—an emphasis on superior-quality frozen foods.

Pros and Cons

William M. Walsh, chairman of National Wholesale Frozen Food Distributors, Inc., is quick to point out the contribution of top-quality frozen foods, as against the second-grade offerings. He outlines cost factors, showing that A- and B-grade foods must go through identical processes all along the line. Here, he points out that (1) both start with the same cost-per-hour labor in planting, cultivating, and harvesting; (2) both require the same type of transportation in the same type lug boxes or crates to packing plants; (3) both must be processed in the same manner, (4) both must be packaged and stored until needed—and in identical zero-temperature warehouses; and (5) both must be shipped under equal zero refrigeration.

Solutions Weighed

It is obvious that B-grade production initiates higher costs in terms of relative sales income. Even the retailer, with little enough cabinet space, would make less profit. The answer is rapid turnover. And although many cite cases where B-grades "came in like a lion, out like a lamb," it is also a fact that supermarkets report volume gains up to 50 percent on some of these items—notably peas and citrus concentrates.

Perhaps Alvin Langfield, president

of National, has the answer. He begins with the succinct premise that B-grade frozen foods are here to stay, like it or not. To prevent a repetition of '46, he suggests:

1. Strong quality control comparable to intermediate standards of canned foods, and

2. Equitable absorption of the resultant reduction of profits from raw producer to retailer in each segment of the field.

And as to overall effect of B-grades on the industry? Here, it is his opinion that the market will go for the lower price, while better brands will try meeting the challenge. He concludes: "As the price narrows, the total market will increase, and the 'A' will enjoy a greater portion of the total."

More Cabinet Space

Another problem is lack of cabinet space on the retail level. Fifty-five percent of food retailers still do not have freezers in their stores. Those who do have adequate space are in the minority.

The result here is a bottleneck. Instances have been reported where orders delivered were left standing in stock rooms for two or more hours while waiting for space to become available. The effects on product quality of such partial thawing and refreezing are well known.

There are those who feel they have the answer to this problem. The solution, they state, lies along the lines of such special plans as that presently spearheaded by Freezer Owners Assn., Inc. This project offers the consumer a large home freezer—along with a four months' supply of frozen foods priced below retail level.

No down payment is asked. Rather, a "pay-as-you-eat" program is outlined to the consumers in the moderate-income group. The emphasis is on selling sizable freezers of 12 cu. ft. or more. To date, the plan has enjoyed more than moderate success wherever promoted.

What this implies for the retailer—and in the last analysis, the processor—is apparent. An increase in the plan's popularity means a corresponding decrease in retail volume under normal competitive conditions. In 1951, for example, metropolitan New York did a $3 million business selling some 60,000 cu. ft. of home freezers. Deliveries per unit averaged 400 lb. of frozen foods, an aggregate of 2,000,000 lb.

Moreover, when the purchaser depletes his supply, it is replenished by a local distributor servicing the plan. Savings to the consumer amount to a fluctuating 12 to 15 percent.

Plan proponents point to how the cabinet-space bottleneck can thus be broken. The fact remains that the retailer is being underbid. He cannot be expected to sit back and complacently watch a competitive Topsy grow. When he begins to fight back, the processor may be caught in a squeeze.

Transportation, Warehousing

Another factor, albeit less controversial, is a "constant" in the minds of field leaders. It is the steady betterment of technics. Processors of frozen foods are rightly proud of their accomplishments on this phase. However, warehousing practices have room for improvement, and too few low-temperature transportation facilities are available.

Future Prospects

What, then, of the future?

A projection of the figures in our table must strongly indicate a continued acceleration in the production of frozen foods.

Leaders assaying the field are confident, despite problems. One reason frequently cited is the performance of the frozen orange juice concentrators.

Though representing but 5 percent of the field, they account for 20 percent of its total volume. And yet, in any single month, no more than 22 percent of the nation's householders purchase this drink.

Another fact is increasing demand by the armed forces. In 1951, orders placed amounted to 92,289,000 lb.—an increase of 48,000,000 lb. over 1950. It is also pointed out how the Services, with an approximate 3,500,000 men today, are ordering more frozen foods than in 1945 when the forces consisted of more than 11,500,000 men.

If further proof is sought that there is no sitting still as tomorrow becomes today, one need only check with the man nearest the consumer—the retailer. A survey released in April by the National Assn. of Retail Grocers indicates that *independent* retail food stores intend to triple their frozen foods business in the next five-year period.

In summing up the potential of the future, it is significant to note that at present the industry accounts for only 2 percent of the nation's food supply.

Thus, field leaders find broad, challenging opportunities ranged ahead for market expansion—inviting intelligent planning and healthful competition. And the enthusiasts among those contributing—from producer on up—are taking courage in the continuing climb of the production figures.

As for the headaches remaining, their solutions are seen in keen appraisal followed by forceful, cooperative action in the mutual interest of attaining the common goal.

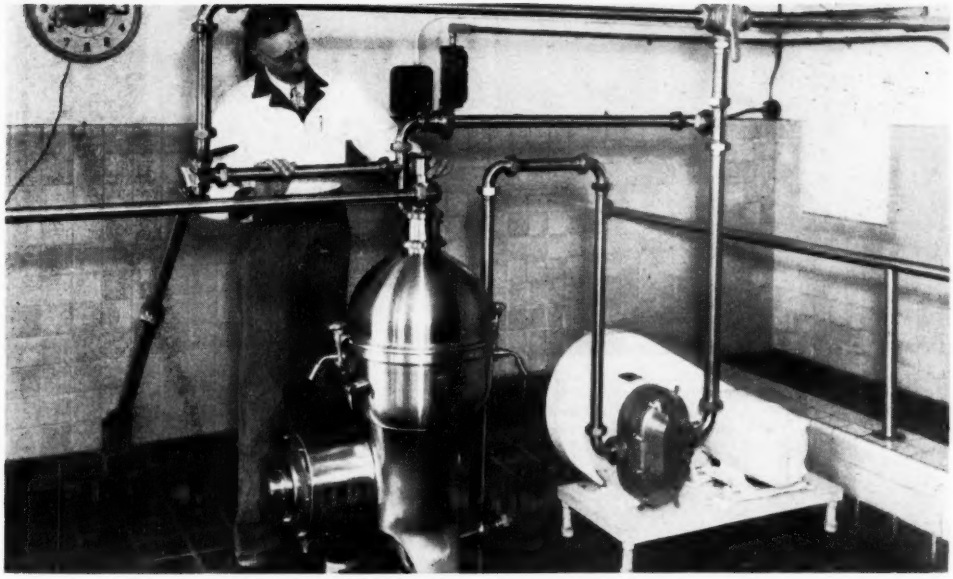
Rapid Growth, Prospects, Indicated by Postwar Figures

Output of Frozen Products as Reported at Recent National Frozen Foods Convention

Category	Base Years	1950	1951
Frozen Fruits & Vegetables	1947 793,521,000 lb.	1,059,274,000 lb.	1,144,000,000 lb.
Frozen Juice Concentrate (Unreconstituted orange juice)	1945–46 226,000 gal.	1950–51 36,000,000 gal.	
Frozen Seafoods (U.S. & Alaska)		287,000,000 lb.	325,000,000 lb.*
Frozen Eviscerated Poultry (Federally inspected chicken)	1947 185,000,000 lb.	408,000,000 lb.	550,000,000 lb.
Frozen Specialties**			

* Total for 1951 does not include shrimp (82 percent of catch is now frozen), shell fish, or imported fish products, amounting to an additional 75,000,000 lb.

** Precise figures lacking. But consumer acceptance of these items is believed to have increased substantially.



OPERATOR adjusts standardizing valve on new unit to obtain milk of desired fat content. Uniform supply is assured by positive displacement pump (right).

Standardizes Milk As It's Clarified

New unit ups product quality, conserves butterfat, and saves labor, time, and equipment . . . Operation separates portion of cream to give constant flow of milk having uniform-fat content

C. K. TALLY
Manager, Creamery Package Mfg. Co., Los Angeles.

Here is a new dairy plant unit that removes the sediment from milk as completely as a centrifugal clarifier—and then, at the same time standardizes the fat content to practically any desired percentage.

There are three specific benefits:

▶ Higher quality milk is thus assured—since addition of skim milk to standardize the fat content is eliminated.

▶ And labor, time, and equipment previously required is saved.

▶ Extra profits are made in butterfat recovered through more accurate standardization.

The Standardizing Clarifier, as this new De Laval unit is called, differs from a regular clarifier, or a cream separator, by having two sets of distribution holes in the disks that divide the milk into thin layers for treatment. The other units have only one set.

The holes near the center of the disks separate a portion of the milk into cream and low-test milk. The cream thus separated moves to the center of the bowl and is discharged from the unit. The separating operation is controlled by an externally operated standardizing valve (see photo) that creates a back pressure on the cream as it leaves the machine.

The low-fat milk flows down the top of the disks and joins the stream of whole milk which has been fed through the outer distribution holes. The mixture then moves to the extreme outer edge of the disks, where it is subjected to maximum centrifugal force before passing over the top disk and out of the bowl. In this way, all of the milk is given a complete clarification.

In a fluid milk operation, the whole milk is usually held in a tank and either skim milk or lower testing whole milk is added to standardize to the desired fat content. This takes time, plus extra equipment such as tanks and pumps which, incidentally, then have to be washed. The Standardizing Clarifier provides the missing link in the chain of continuous operations by eliminating the extra equipment and labor.

Made in three sizes—6,000, 12,000, and 20,000 lb./hr.—the units operate through the temperature range from 40 to 135 deg. F., and standardize downward from 0.01 to 2.0 percent. For best results, however, fat content and temperature of the source milk should be held uniform.

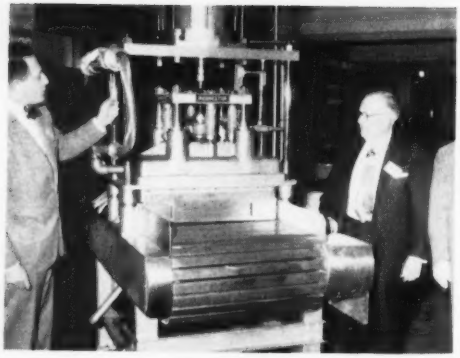
This poses a question: Exactly where should the standardizer be placed in the plant?

Answer: Obviously, where all variables can best be controlled.

It could be located: (1) Between a storage tank and pasteurizer vats, (2) between a storage tank and the surge tank of an HTST system, (3) between one tank and another, or (4) between a tank truck and storage tank, or HTST system.

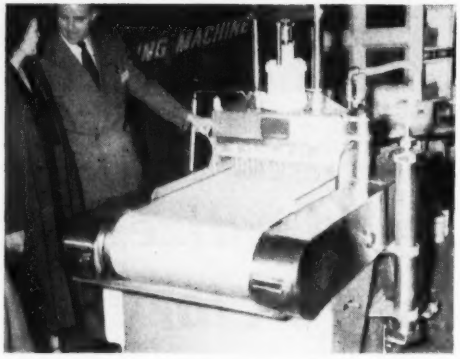
WHAT'S NEW FOR PACKERS

Eleven innovations in equipment shown at National Independent Meat Packers meeting. Include units for curing, cutting, pumping, filtering, testing, controlling



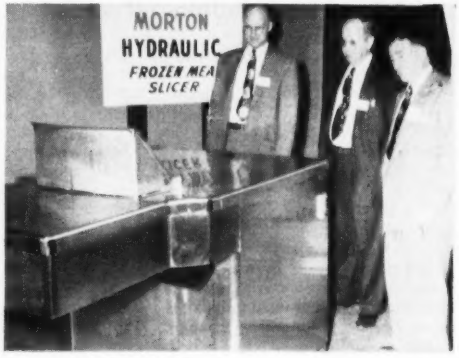
LATEST continuous pickle-injecting machine is Permeator, an all-stainless steel unit with 144 needles and a capacity of ten bellies per min. It has self-contained, electrically driven, pneumatic power system.—Cincinnati Butchers Supply Co. (82A)

IMPROVEMENTS have been added to the Allbright-Nell (Chicago) continuous injecting machine. Shown are new cloth filters for pickle-recovery system. These lift out and can be laundered. Entire frame unit has been changed to stainless steel. (82B)



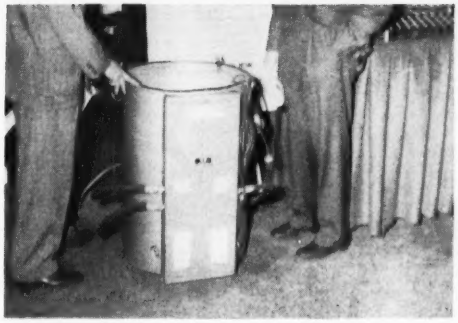
NEW MODEL of Inject-O-Cure is designed for small plant use, handles eight bellies per min. Unit is all stainless steel, has self-contained air-supply and pickle-pumping system, is much smaller than original machine.—Globe Co., Chicago. (82C)

NEW SILENT CUTTER provides overside, automatic unloading (discharge disk is pointed out in picture). Other features are automatic lubrication, a knife-locking collar that prevents slippage, and a centralized control station—John E. Smith's Sons Co., Buffalo, N. Y. (82D)

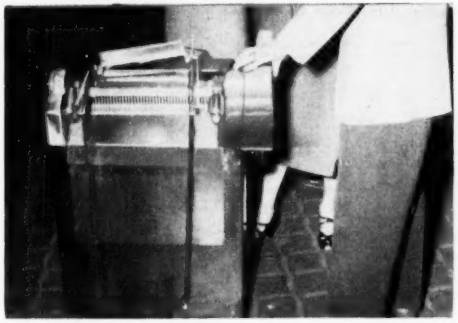


FROZEN-MEAT SLICER has moving parts enclosed, is easily disassembled. Hydraulically operated blade has overload safety feature. Speed is 26 strokes per min. Slice thickness is adjustable ($1\frac{1}{2}$ to 3 in.)—Meat Industry Suppliers, Inc., Chicago. (82E)

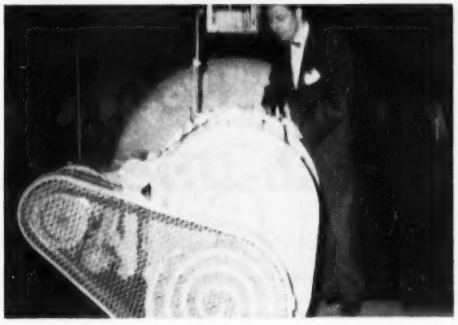
COMPACT pickle pumps operate on air or hydraulic pressure. Unit is easy to clean, includes positive barrier between air and pickle solution. Speed can be regulated, and six lines served from one unit—H. J. Mayer & Sons, Inc., Chicago. (83A)



VACUUM FILTER for fats is a compact, mobile unit which adds a suction boost to gravity filtering—claimed to be fast and efficient. It uses 1 lb. of filter aid and a single filter paper for up to 1,000 lb. of lard.—Globe Co., Chicago. (83B)



HAM SKINNER is first automatic unit of its type. One blade strips off skin, another removes excess fat. Trimming is said to be more uniform than by hand. Total operation takes 5 to 10 sec. per ham.—Townsend Engineering Co., Des Moines, Iowa. (83C)

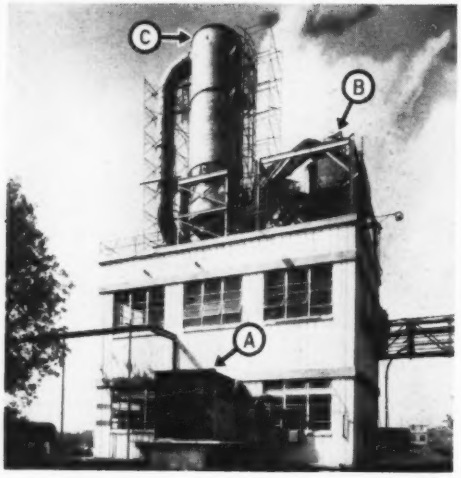


COOKER DRIVE, offered by Allbright-Nell (Chicago), is supported on shell of rendering cooker and directly coupled to shaft. By eliminating bending and torque forces, new drive provides greater efficiency and eliminates a number of wear points. (83D)

SAMPLER provides accurate 5-min. method of determining fat content of ground meat. Sample is placed in metal cylinder and compacted. Instrument is spun in column of water, and exposed calibrated column gives fat reading by hydrometer principle—Lipometer Co., San Diego, Calif. (83E)

CONTROL STATION for air-conditioned smokehouse places all functions in dustproof, integrated cabinet. Two-pen control thermometer regulates temperature and humidity. Static-pressure regulator, accessories, and electrical controls are in cabinet.—Drying Systems Inc., Chicago. (83F)

Want additional information about any of the items shown in this picture article? Just circle the key number (in parentheses at end of each caption) on the Reader Service coupon adjacent to inside back cover. Then drop it in the mail—and complete data will be sent you directly.



◀ **RADICAL** starch flash-drying installation. Burner and air filter may be seen at (A), cyclone separator is just above roof at (B), and wet scrubber is at (C).

To update its starch finishing to keep pace with other plant efficiencies, enterprising Midwest miller went to an untried technic—flash drying. And today this revolutionary air-suspension system is setting new standards in production and product quality

KURT ASPMAN
Manager, Special Services Department,
American Maize-Products Co., Hammond, Ind.

Now— *Flash-Dried* Starch

Making still another progressive stride in the food field, flash drying is now being commercially used to handle wet starch.

Our company, American Maize-Products of Hammond, Ind., decided upon this type dryer to match its newly streamlined centrifugal operation.

Construction on the 300,000 lb. per day flash unit was completed late last summer, and it was put on the line soon afterward. The old rotary kiln dryer previously used for starch drying was then retired as capacity of the flash unit was gradually brought up to design.

Highlighted in the new installation are the following factors:

▶ Production of a high quality powdered starch without added pulverizing.

▶ Flexible, trouble-free operation needing only minimum supervision.

▶ Integration of protective devices for eliminating conditions which might establish explosion hazards.

Plans in the original engineering called for a drying unit that would be supplied with a concentrated starch slurry. This slurry would then be dewatered by two horizontal basket-type centrifuges to a cake-like consistency of about 35 percent moisture. As projected, this material would be introduced into a continuous stream of hot air, by means of a cage mill, causing instant drying through evaporation of moisture from surfaces of the starch particles. The dried starch would be separated from the air by centrifugal force in a cyclone and subsequently classified.

Here is how the program was finally effected (see accompanying flowsheet):

The 23-deg. Baume starch slurry is pumped at 95 gpm. from a 30,000-gal. storage tank in the No. 2 table house and thus carried to the flash dryer building. Slurry flow is measured by a 2-in. flume, then passes through a nylon screened shaker, where any suspended fiber is removed. From the shaker, the slurry flows to a 7,000-gal. storage and transfer tank, which holds

"Why We Pioneered Flash Drying of Starch"

In the immediate years after World War II, our company was being pinched production-wise by limited corn starch facilities.

To improve one phase of the operations without seeing that the others were also streamlined wouldn't work. For it is usually necessary to revise a complete process in order to benefit from a single improved operation.

Such was the situation when we started investigating the various forms of starch drying, with the thought in mind of matching the added capacity of our soon-to-be-installed centrifugals. These units were being put in to replace the awkward, space-taking starch tables.

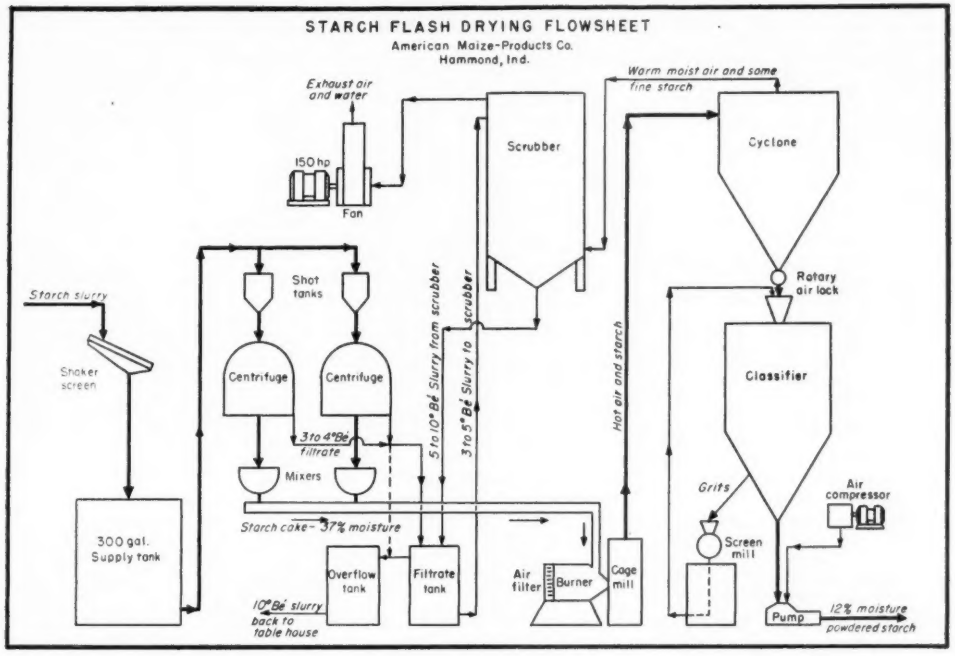
Late in 1949—with the project of superseding our table house already underway—the company decided to go ahead with replacement of the already overloaded and antiquated kiln dryers. Analysis of the capital investment and operating costs of conventional dryer equipment suggested a try at a totally new approach to the problem.

The technic of flash drying—used with great success in our feed house since 1948—seemed to have the most merit. But there were too many "ifs" involved to justify an immediate commercial unit on starch. It was decided that some of the already visible questions would have to be solved in pilot operation to be on firm ground with subsequent estimates and engineering.

Installed early in 1950, the pilot unit gave us vital data as to operating conditions, starch quality, thermal efficiencies, and many other important factors. Among other things, details such as starch adhesion to inside surfaces were investigated and corrections made in air velocity to minimize such conditions.

During tests, control and process engineers studied products from the new dryer and compared it to starch from other dryers in the plant. All data proved flash-dried starch to be as good or superior to that we had been making.

And so, after completely evaluating pilot plant data, management gave the go-ahead to install a 300,000-lb.-per-day unit for production.—*K.A.*



a 2 hr. dryer supply for processing.

Next, the slurry is pumped from the transfer tank to either of two 400-gal. "shot" tanks. The latter are poised for gravity feed to two filter centrifuges.

A shot to the centrifuge supplies enough material to almost fill its basket. Then more slurry is allowed to flow directly from supply through the shot tank to complete the filling and overflow the basket—in order to flush off the yellow protein layer that forms on its inside. If this layer were allowed to remain it would build up such a resistance that air would not be able to flow through the cake and replace water. This overflow slurry recycles back to the supply tank and is kept separate from the water that filters from the basket.

Operation Robot

All centrifuge operations are automatically actuated and timed by an oil-type control unit, located adjacent to the centrifuge. Thus, the charging, spinning, washing, and discharging of each load are "sequenced" through opening and closing of valves to allow oil under pressure to flow to hydraulic cylinders on the apparatus. Manual operation of all cycle steps is also possible from the control station.

A shot of slurry is dewatered by spinning for about 6 min. at 850

"How Our Pilot Plant Solved the Specifications"

Much development work was required in getting acquainted with the processing characteristics of flash-drying starch before we finally ordered the commercial equipment late in 1950.

Of more than passing concern was the problem of explosion—especially since the flash unit would have to be direct fired to compete economically with the more conventional rotaries. Plant men know the devastating type of explosion that can be set off with the critical proportion of finely divided starch in hot air.

Fortunately, this knotty problem and most of the other questions were satisfactorily solved during the pilot plant runs. The table below summarizes the more important findings preparatory to final plant design.—*K.A.*

Problem	Findings
1. Explosions within dryer	Dozens of attempts to blow up pilot plant artificially proved unsuccessful. Specified: Rupture diaghragms on vulnerable equipment.
2. Inlet gas temperature	Specified: 600 deg. F.
3. Product quality	As good or better than kiln dried starch.
4. Product contamination	Specified: Parts contacting starch to be of stainless steel. Air to burners to be freed of possible contamination by using self-cleaning oil immersed filters.
5. Fuel to be used	Preferably gas. Since natural gas was not immediately available, it was decided to provide special facilities for burning liquified propane.
6. Type safety system	Specified: Electrical interlocking of all equipment, including automatic burner-flame devices to shut down system in event of failure of any unit. Limit switches to stop burner if temperature or pressure goes too high.
7. Necessity of wet scrubber	Confirmed. Unit to be placed between cyclone and exhaust fan to recover starch that would otherwise be lost to atmosphere.
8. Flash dryer capacity	Favorable in comparison with equivalent space and investment for kiln-type dryers.

rpm., forming a cake containing moisture ranging from 32 to 40 percent. When the cake has spun for an additional couple of minutes—total cycle, about 8 min.—an hydraulically operated peeler knife cuts it from the basket and drops the charge into a horizontal ribbon mixer, where moisture variations are equalized.

Meanwhile, filtrate water from the centrifuge flows to a surge-filtrate tank, is pumped through the dryer's dust collector, returns, and overflows into another tank, from where it is pumped to the table house. Reason for the separate filtrate tank is to insure a relatively light slurry to the scrubber in case the overflow slurry is so heavy in starch it cannot be recycled.

From the ribbon mixer the starch drops to a variable speed screw conveyor that feeds the product into the flash dryer section of the process.

Mounted at ground level outside of the dryer building are an automatic self-cleaning filter and a dry-type air filter, also a stainless steel gas-furnace housing equipped with a burner assembly. Here, the air is drawn from the atmosphere—through the suction of a 150 hp. fan—at a rate of 28,000 cfm. and is cleaned and heated to 600 deg. F. before passing into the cage mill, where it contacts the wet starch.

Airborne Particles

Suspension of the starch in the hot air stream occurs in the cage mill through the action of a spoked 7-ft. rotor, which turns at 350 rpm. This mechanical agitation breaks down any tendency of the product to lump and exposes large surface areas to the hot air. Due to the finely divided form of the starch, evaporation takes place almost immediately and continues as the product passes up the 36-in. riser duct and through the cyclone.

Hot air, with its load of solids, is introduced tangentially into the 14-ft. cyclone located on the roof of the building. Centrifugal force throws the solid particles against the wall of the unit and they then drop through a rotary air lock into a hopper. The air moves to the top of the cyclone, goes through a wet-type dust collector, where any fines are collected, and then is exhausted to the atmosphere through a large fan.

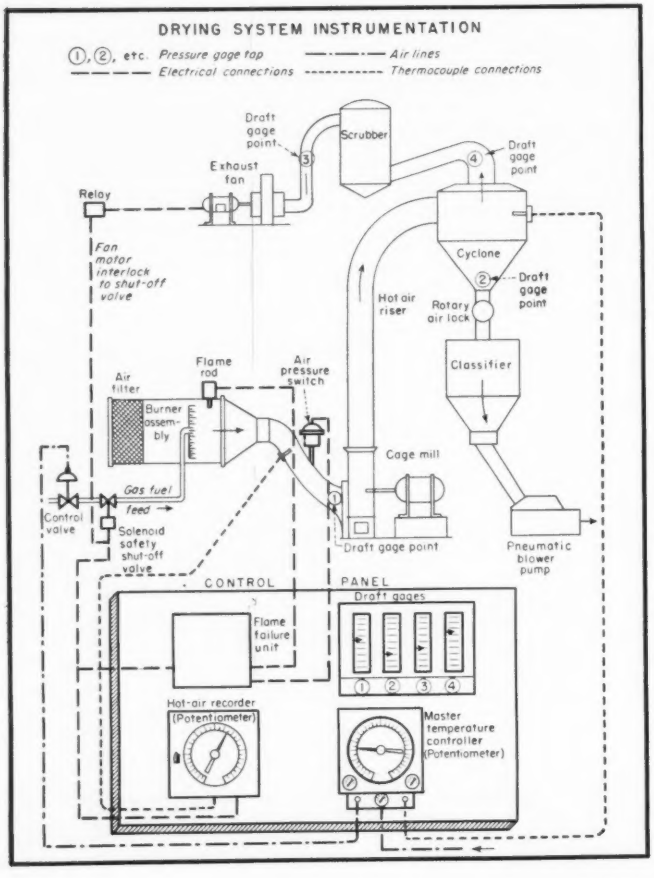
Dried starch leaves the cyclone through a rotary air lock. While fairly fine at this point, it is not fine enough to be considered commercial powdered starch. Therefore, it is next sent through a mechanical air separator, which can classify the product to any degree of fineness required. Separated grits are sent through a screen hammer mill, and the resulting powder is recycled back to the classifier via a 27-ft. mass-flow bulk conveyor.

Finished, powdered dry starch—with a final moisture content of about 12 percent—is air-activated, while dropping from the classifier, by a 5-in. pump and then pneumatically conveyed at a rate of 12,500 lb./hr., through 600 ft. of piping to the dextrine or starch bagging departments. A pushbutton, located in the classifier room, actuates an electrically driven transfer valve for directing the product stream to either department, as required.

Here are details on the reclamation of the starch that would be lost to atmosphere: In the multi-wash collector mounted on the dryer-house roof between cyclone and exhaust fan, exhaust air rises through scrubber baffles with a tangential air flow pattern, and contacts filtrate water flowing counter-current and wetting the baffle inner surface. The starch particles as they impinge on these surfaces are wetted and subsequently carried out with the wash water at the bottom. This resultant starch slurry is pumped back to the table house for reprocessing.

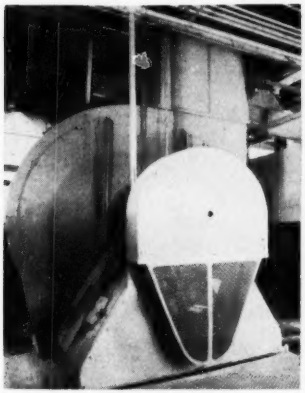
Control Panel Safeguards

All automatic controls and interlocking devices operate via primary components located in a central panel on the centrifuge floor. They are designed to insure a fixed starch moisture, eliminate product pileups, and prevent any excessive air temperatures or formation of unburned gas mixtures.

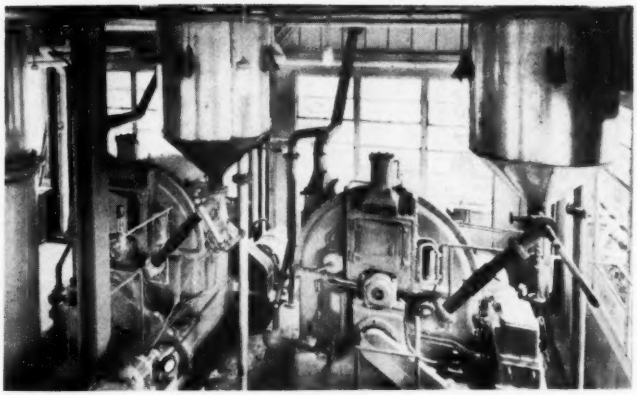


MANY SAFEGUARDS have been built into this flash-drying instrumentation setup. Design accents efficiency as well as protection of personnel.

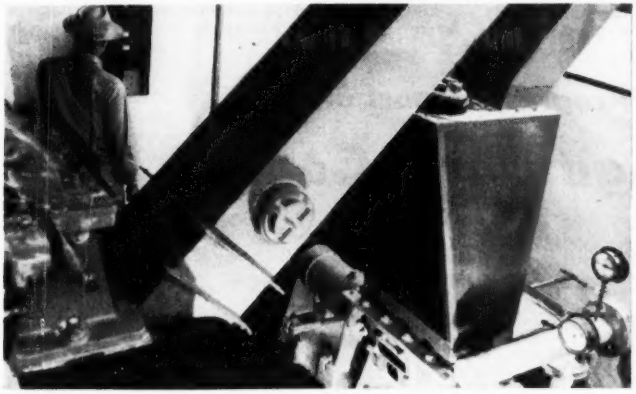
Process Is Continuous and Automatic



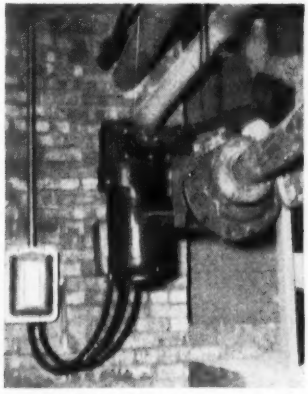
CAGE MILL suspends cake in 600-F. air, uniformly dispersing particles.



AUTOMATIC centrifuges dewater incoming starch slurry before charging dryer. Spinning at 850 rpm., they're hydraulically controlled.



FINISHED PRODUCT is pneumatically conveyed from classifier to dextrine or to starch bagging sections, 600 ft. distant. Operator directs flow to either section—merely by pushing button to operate motor valve.



MOTOR-DRIVEN valve, actuated by the button, sets path for air-suspended starch on its way from dryer building.

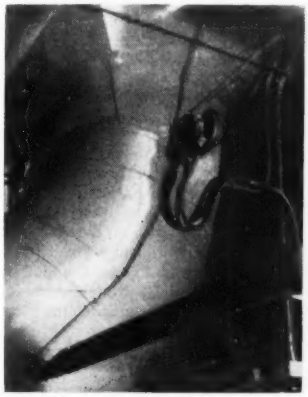
In pilot tests a very simple but effective process-control system was determined. By letting the temperature of exhaust air from the system automatically control the burner rate, it was found possible to keep the system balanced despite variations in incoming product moisture. At the same time, a fairly close control of final product moisture was achieved.

In practice, cyclone exit-air temperature is measured by an iron-constantan pencil-type thermocouple, which is connected to an electronic recorder-controller that is graduated 75 to 225 deg. F. Controlled air from this instrument positions a Conoflow air-motor operated valve in the main gas line to the burners.

In addition to its pneumatic control function, the unit also contains two mercury switches that are actuated by the instrument measuring system. One switch performs as a high temperature limit and automatically shuts off the burner and feeder conveyor to the dryer if air temperature is excessive. The other, set at an intermediate temperature, operates an alarm to give the operator a chance to take corrective action before conditions cause the dryer to "kick out."

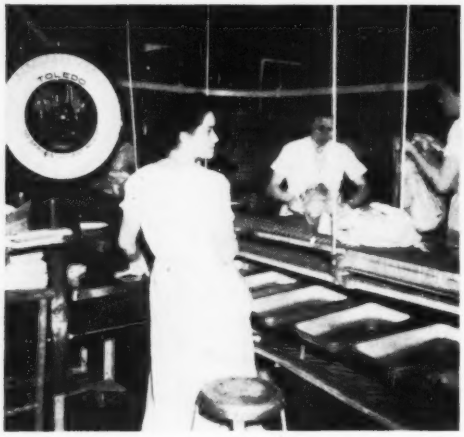
Another electronic unit on the panel—with a range of 0-800 deg. F.—records the inlet air temperature through a chrome-alumel thermocouple located at the base of the riser duct. This instrument contains an electrical control contact that operates through the same relay as the exit temperature controller to shut down the furnace and feeder con-

(*Turn to page 164*)



THERMOCOUPLE in duct to cage mill measures and limits temperatures.

4-Step Brief of Advanced Operation →



1 **EVISCERATED** turkeys arrive in pans, are weighed (left), moved to conveyor, and encased in wrapper.

2 **OPERATORS** clasp bags around vacuum nozzles, then press foot pedals and air is sucked from packages.

Progress Report on

Packaging the Gobbler

—A revealing checkup on a foresighted vice-president's '47 predictions—leading up to new '52 strides that are speeding turkey wrapping and casing and simplifying merchandising

FE STAFF

How far representative phases of food packaging have advanced just since World War II is strikingly reflected when 1952 visits are made to front-rank plants.

A look at the fast-paced poultry packaging operations of C. A. Swanson & Sons, Omaha, Neb., shows the accent on engineering.

Take 1947 as a "fix-point" for perspective of this company's strides. In February of that year, Crawford Pollock, Swanson vice-president, told in a special article* how several turkey packaging innovations had just been made by the company—the introduction of cut-up Toms, and the unit cartoning of wrapped whole birds.

As he predicted, these technics have become almost standard practice in the industry in the short span of five years.

And today, the company is forging on ahead in similar fashion with two further innovations—which may likewise have far-reaching industry influences. These are:

- **Use of a form-molded "Cry-O-Vac" (Dewey & Almy) turkey wrapping for speed-packaging output and improving product protection.**
- **Development of the "Uni-Pack" concept—packaging and shipping, in a single case, birds of similar weight.**

Feasibility of the latter advance has been credited to the benefits furnished by the Cry-O-Vac. And the "how" of it is brought out in an examination of the vacuum-bagging steps on the company's revamped turkey packaging lines. The details follow:

Toward A Tougher Wrap

Primary in packaging the whole turkey is the problem of getting a moisture-proof, transparent wrapping that will withstand the rough handling common in shipping. In '46, Swanson solved this by over-wrapping the bird in film and then enclosing it in an individual waxed carton.

However, while the transparent film provided an attractive inner package, it was often damaged during opening of its enclosing container by storekeeper and consumer. Furthermore, the wrapping and sealing procedure then employed required tedious hand operations and necessitated a cumbersome concentration of personnel to keep pace with the smooth flow of birds from the company's highly mechanized eviscerating department.

- **Today's line—using the new vacuum-bagging technic—can smoothly package up to 15 birds per minute with less personnel and with much more uniform results than possible back when the former method was in use.**

Start of line operations is an overhead Wilcox chain conveyor that delivers clamp-suspended turkeys from the eviscerating department. Before birds are unclamped, a girl inserts a waxed-paper packet of giblets into the body cavity.

* "Packaging the Gobbler," page 103, Feb. '47 *Food Industries*.

3 **WRAP ON BIRDS** is shrunk to close-fitting skin when the turkeys are immersed in hot water in tank (right).

4 **CARTONED** fowl are palletized in 6-tier loads, then trucked into −30-deg-F. room (right) for deep freezing.

With giblets enclosed, birds are then unclamped and placed on a Barker "race track" tray conveyor, which serves the prepackaging part of the line. Next operation is performed by three girls who remove the poultry and wrap and tie the legs. The neck is then wrapped in waxed paper and "turned" into the body cavity. This provides a more compact package and prevents subsequent tearing of the wrapper.

The wrap-ready birds are then placed on a wire-mesh stainless steel belt conveyor that runs parallel and counter to the tray conveyor. Turkeys are removed from the conveyor and graded and weighed on two Toledo scales. The weight slip and a small two-page defrosting and cooking instruction-folder are then affixed to each turkey as it is returned to the conveyor belt.

Vacuum Shrinks Wrap

Next, four girls remove the birds from the conveyor and insert them into Cry-O-Vac bags. Still farther down the belt, three attendants operate goose-neck like nozzles that pull a vacuum on each package.

Producing a vacuum in the bag consists of clasping its open mouth around the nozzle of a pipe from a vacuum pump (Perfection) below the conveyor. Foot pedal operation of the system (Dewey & Almy) allows a 20-in. vacuum to be drawn on the wrap, which is then twisted and secured with a rubber band before the packaged fowl is again returned to the main conveyor.

Birds are finally removed from the conveyor by a girl, who crayons the weight on the outside of the wrap, then feeds the product to a hot water immersion tank (Gordon-Johnson). Treatment with 210 deg. F. water results in approximately 35 percent shrinkage in the bag, thus producing a tough, skin-tight transparent covering over the bird.

Excess bag is trimmed off turkeys leaving the shrinker. Then the birds are deposited on a long stainless-steel table for sorting by weight.

Four different sizes of waxed, lithographed cartons are available for individual consumer packages. The larger two accommodate moderate-sized Toms (about 14-17 lb.) and large Toms (up to 20 lb.). Beltsville Hens, which run 10 lb. or less, go into the smallest carton, and hens up to 14 lb. are packed in a case of still another size.

Boxed turkeys are loaded on a skid, 16 per tier, six tiers high, and moved by hand truck into blast freezer rooms. Here, a −30-deg.-F. temperature freezes each bird solid in less than 10 hr. After freezing, the turkeys are transferred to 0-deg. storage, from whence they are finally shipped in refrigerated cars or trucks.

"Uni-Pack" System Developed

Shortly after adoption of Cry-O-Vac packaging the tougher qualities of this new protective wrapping suggested an improved system of bulk packing birds for those merchandisers who do not use individual boxes. Accordingly, wrapped birds are simply sorted by weight in 4 oz. increments. Then four birds of the same weight are packed together in a single crate, which is marked and sold at the low figure of the particular weight group.

Improved Stock Control

The primary result of this new system—called "Uni-Pack"—has been to provide the distributor with a convenient way to inventory and merchandise his stock of frozen dressed turkeys.

Swanson has found that customer enthusiasm more than offsets the losses suffered in weight standardization. Also, studies have revealed that this method of handling is actually less costly than exact-weight unit packaging once the product leaves the packaging line.

Uni-Pack crates are loaded 18 to a skid and follow the same path as carton-pack birds to freezing and shipping. However, less manual handling in movement and a decided simplification in company accounting provide savings of considerable magnitude for the company.

In 1951, the Cry-O-Vac packaging program was installed in four of the company's big turkey processing plants—at Worthington, Minn.; Modesto, Calif.; Fremont, Neb.; and Omaha. The company is now reviewing the possibility of extending this operation to all its plants this year.

Currently, a new, tougher film is being developed and tested to further improve on the protective qualities of the wrap in shipment.

HERE, optimum atmospheres are maintained mechanically in every plant section at all times, both

This Plant's *Fully* Conditioned:

Automatic 3-way service to process, storage, and office areas

M. C. HALEY, B. B. REILLY, and P. C. STEPHEN

Respectively, Chief Architect & Construction Engineer, Sunshine Biscuits, Inc., Dayton, Ohio; Manager, Air Conditioning Department, Dravo Corp., Pittsburgh; and Sales Engineer, Dravo Corp., Cleveland

Incorporation of a completely automatic combination air-conditioning, cooling, and heating system makes Sunshine Biscuits' new multi-million dollar bakery and confectionery plant at Kansas City, Kan., one of the most outstanding of processing facilities.

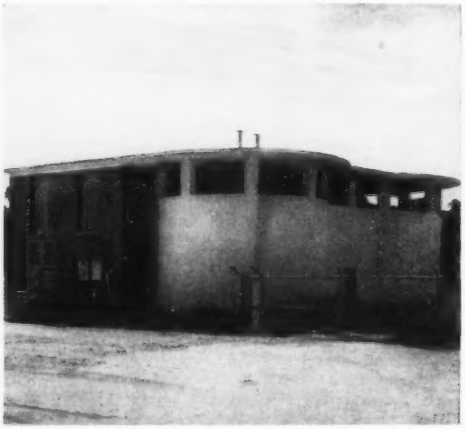
Flooded with light by 2,000 metal-frame windows containing 7,000 panes of glass, each one glare-proof and heat-absorbing, the building symbolizes the company name. And here, the engineer has taken over, for no windows ever have to be opened for ventilation —the plant being air-conditioned throughout.

The system was designed not only to control the temperature and humidity for the comfort of the 1,200 employees but also for production control on the various manufacturing processes.

Sanitation Stressed

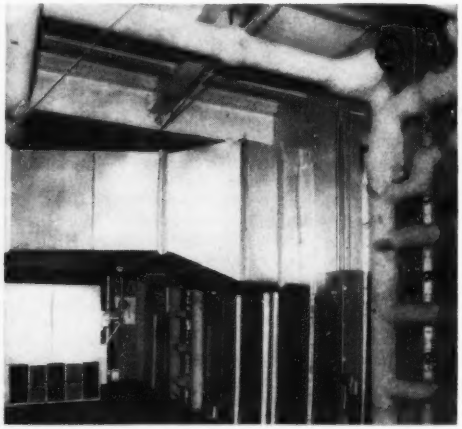
Designed by the company's engineering department, the plant is 1,200 ft. long and rises five floors high in its center section (see photo). Sanitary

Pumphouse supplies water . . .

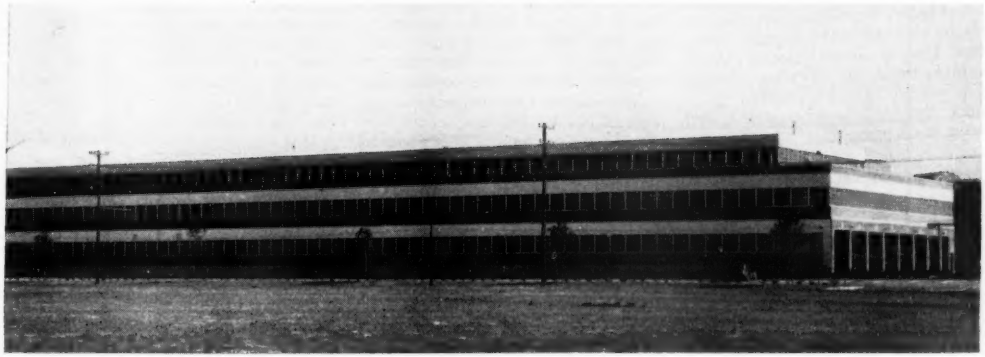


FUNCTIONAL-DESIGN structure houses well pumps and water treatment facilities that key cooling system.

. . . to cool air . . .



INSIDE metal housing (right), air passes through filters, then goes over chilled-water coils and into ducts.



summer and winter. There's never a need to open any of ultra-modern structure's 2,000 windows.

Cooled, Heated, and Humidified

pays multi-benefits at Sunshine's new biscuit and candy factory

features have been stressed throughout the building. For example, the air is constantly filtered. Further, the inside walls are faced with easily-cleaned glazed tile, and ceilings and columns are coated with a high-gloss white enamel paint.

Ductwork that distributes air from the heating and conditioning units is fabricated entirely of aluminum. Fifty tons of this sheet metal were used for the ducts, aluminum being readily available at the time of construction.

Many unusual engineering features were designed into the combined air conditioning, cooling, and heating system by Dravo Corp., Pittsburgh, which installed all mechanical equipment. Probably most notable is the efficient way well water is used in the cooling and air conditioning. There are several basic functions:

1. Comfort air conditioning (general offices, cafeteria, etc.)—Year 'round 72 to 78 deg F., 50 percent relative humidity.

2. Air conditioning for manufacturing processes (production area of plant)—Year 'round, ranging from 65 deg F. at 40 percent RH. to 82 deg. F. at 50 percent RH.

3. Cold storage air conditioning (Raw materials for production)—Year 'round, 20-, 35-, 45-, and 60-deg. F.

4. Humidification for manufacturing processes—Year 'round 80 deg. F. at 80 percent RH.

Water (54 deg. F.) is pumped from four 90-ft. gravel-packed wells (adja-

. . . serving all working spaces

COMING IN through grills in duct, conditioned air keeps atmosphere in dough-cutting room "just right".

IN LIKE FASHION, temperatures in all other areas are exactly controlled. Here, we see duct in candy room.

cent to the main building) to a combined pump house-filter plant located on the west end of the property. Here, two Proquip Iron Removal Units, manufactured by Walker Process Equipment, Inc., are installed to reduce the iron content of the well water to .3 ppm.

Anthracite Filters Used

The process consists of spraying the well water over finely ground anthracite coal. Water enters at the top of two vertical concrete gravity-filter tanks 19 ft. in dia. and 11 ft. high. Filtered water is then stored in a 70,000-gal. concrete tank located under the filter plant. Iron content of the well water is high. In a normal 8-hr. day, 235 lb. of iron are removed. The raw well-water would be unusable in cooling coils and condensers.

Three DeLaval centrifugal booster pumps, with rated capacities of 950-, 1,150-, and 1,350-gpm., are then employed to force the softened water into the well-water circulating system in the main building.

The booster pumps are regulated by an Automatic Control Co. special pressure-actuated unit which starts and stops them in sequence. The pumps simulate a stand pipe and give volume control as the demand for water changes.

The pumps are primed continually and automatically, using electrode-type controls, with the vacuum being formed by a Nash pump. An ejector, water-pressure operated, acts as a standby.

About 3,000 gal. of well water flow each minute through the many miles of piping in the circulating-conditioning system. This is enough water to supply a city of 35,000 people. Treated well water, without further refrigeration, is used as the cooling agent for most of the comfort air-conditioned spaces—a load of 700 tons of refrigeration.

Used for Many Purposes

In addition to this service, the well water has other uses. In the basement of the main building there is a 30,000-gal. concrete reservoir that supplies the necessary water for the condenser in the main and auxiliary water chillers. This reservoir is served by the well water return line via pneumatically operated valves actuated by two float level controls in the reservoir.

Between reservoir and return line there is a bypass set to bleed 100 gpm. of water so that at least one of the booster pumps will be in continuous operation. This insures filling the condenser water reservoir at such times as the coil cooling requirements might be low. Conversely, a high level overflow in the reservoir allows drainage to the sewer when the condenser water requirements are less than what is needed for the well water cooling coils.

Two 350-ton York compressors, capable of cooling 865 gal. of ethylene glycol brine per minute from 38 to 30 deg. F., are used in conjunction with the cooling cycle in the chilled water system. The two condensers are supplied with well water (from the 30,000-gal. reservoir) by two DeLaval 1,100-gpm. pumps delivering against a 25-ft. head and driven by 10-hp. motors. Well water also is supplied to the auxiliary condensers serving the cold storage room air coolers.

Freon-11 is employed as the refrigerant in the main chillers. These units employ 300-hp. G. E. synchronous compressor motors equipped with speed increaser gears. Three 1,000-gpm. pumps driven by 30-hp motors supply the chilled brine piping system against a 95-ft head. All of this piping is insulated with cork. Also, the brine cooling units have cork insulation and asbestos cement finish.

Added Fire Protection

Well water stored in the 70,000-gal. reservoir under the pump-filter plant is also used as a stand-by supply for the fire pump, which is connected to the stand-pipe and sprinkler system. In order to guarantee an available water supply for the automatic fire pump, the booster pump suction line extends down into the reservoir to the 28,000-gal. level. This leaves the balance of 42,000 gal. of well water available for immediate use in case of a fire.

The controls are so arranged that the booster pumps are automatically de-energized when the fire pump starts operating. This gives further assurance of additional water in the reservoir in case of an emergency. The fire pump is driven by a 75-hp. motor and is rated at 1,000-gpm against a 230-ft. head.

Another important function of this well water: On the flat roof of the main building there is maintained in the summer a 3-in.-deep "lake," holding about 225,000 gal. This provides evaporative cooling which is particularly practical for reducing the temperature on the large roof area.

Heat With Natural Gas

The availability of natural gas gave Sunshine's management a very economical fuel for space and production heating. It was decided to use 33 direct-fired Dravo "Counterflo" warm-air space heaters. Because these units could also be fired by oil, 27 were equipped with combination burners so that conversion in an emergency could be made without delay. This would save gas entirely for baking in event of temporary curtailment. The stand-by fuel oil is stored in a 20,000-gal. tank outdoors.

It is estimated that employment of these space heaters, instead of a conventional boiler plant and steam distribution for the heating application, is resulting in a very substantial dollars-and-cents saving. The heating and cooling requirements for the building presented a challenging engineering problem, for a variety of temperatures are requisite in the plant—from 20 to 140 deg. F. This does not include the process heat required for baking and cooking.

Control Systems Standardized

Pneumatic controls have been provided for the many, diverse systems described. In order to simplify and standardize, it was decided to analyze all control needs into five functions which, in various combinations, would meet any demand. Equipment and functions may be briefed as follows:

1. An electro-pneumatic switch, connected to the fan motor, for controlling outdoor and recirculating dampers; a gradual switch to position the dampers when the fan is in operation; and a safety thermostat to prevent freezing of water coils during freezing weather.

2. A direct-acting room thermostat that controls a reverse-acting valve in the water supply to the well water cooling coils.

3. A reverse-acting type room thermostat to regulate a three-way valve controlling the supply of chilled brine to the cooling coils.

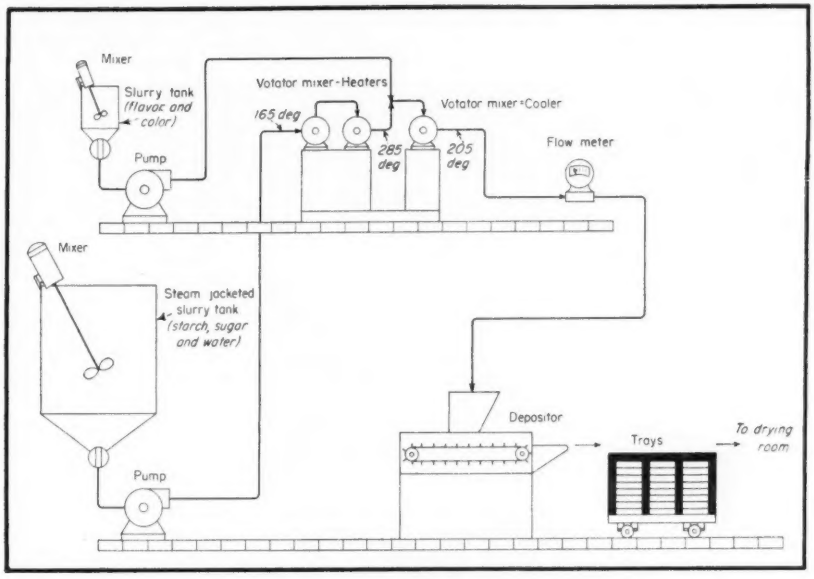
4. A reverse-acting humidistat which, by working through a direct-acting cumulator, operates a three-way valve to increase the flow of chilled brine through the cooling coil when dehumidification is required.

5. A reverse-acting gas valve (or electro-pneumatic switch) on a space heater to provide reheat when necessitated by humidity control requirements.

The general offices, which occupy about 13,200 sq. ft. of the first floor, are kept at 78 deg. F. in the summer and 72 deg. F. in the winter at not to exceed 50 percent relative humidity. Equipment for serving this area is located in a basement mechanical room. A 12,000-cfm. fan discharges conditioned or heated air into distributing ductwork concealed behind acoustical tile. The air is then sent into the offices through ceiling diffusers.

Special high-temperature space heat-

(Turn to page 166)



Here's "Blueprint" Given Confectioners for Setting Up—

Continuous Starch-Jelly Process

Conference-goers also get tips on: ¶Proper humidities in processing . . . ¶Colors and their problems . . . ¶Improvement of chocolate-coating gloss. . . . ¶And the role of antioxidants

NEWEST development in the confectionery field is a continuous method of cooking and cooling starch-gum jellies and metering them directly to a depositor. Now past the pilot-plant stage, this improved process is seen raising the output of uniform quality starch-jelly candies at savings in labor and floor space.

Word of the advanced technic highlighted the Sixth Annual Production Conference of the Pennsylvania Manufacturing Confectioners' Assn., recently held in Bethlehem, Pa., in cooperation with the Lehigh University Institute of Research.

Confectioners also got practical details on optimum humidities for various departments and processes, proper methods of preparing color solution and tips on problems, production of uniform gloss on modified chocolate coatings, and up-to-the-minute information on the role of antioxidants in candies.

Now about the starch-jelly process:

Employed is an insulated, jacketed, three-cylinder Votator mixer-heat-exchanger assembly for continuously cooking and cooling 2,500 lb. per hr. of starch-sugar slurry.

This slurry is first heated to 165 deg. F. in a jacketed mixing tank, then pumped at uniform rate, under 45 psi., through the heat-transfer units in a matter of seconds.

First heated to 285 deg. F. in two steam-jacketed Votators, the slurry is then rapidly cooled to 205 deg. F. in a cold-water jacketed unit. However, before the cooked product goes into the latter unit, a flavor-color solution is introduced.

Moisture content of the confection product leaving the cooling unit is 22 percent. An additional 2 percent moisture is lost as the starch-jelly candy is metered into the hopper of the depositor to be cast into trays.

This highly advanced, engineered process was described by T. A. White, chief chemist, National Starch Products, Inc., N. Y. C.; J. P. Bolanowski, pilot plant supervisor, Girdler Laboratories, Girdler Corp., Louisville; and V. R. Ciccone, assistant works manager, Charms Co., Bloomfield, N. J.

Optimum Humidities Listed

Cataloged for the candy men by V. P. Victor, consulting engineer, N. Y. C., were the following optimum relative humidities for various confectionery departments and processes:

Department Process	Percent Relative Humidity
Chocolate pan supply	55-45
Enrober room	30-25
Chocolate cooling tunnel air	95-80
Hand dippers	45
Molded goods cooling	85-70
Chocolate packing room	50
Chocolate finished stock storage	50

Center tempering room	35-30
Marshmallow setting room	45-40
Sanded gum drying	25-40
Gum finished stock drying	65
Sugar pan supply air (engrossing)	30-20
Polished pan supply air	50-40
Pan rooms	35-30
Nonpareil pan supply air	20
Hard candy cooling tunnel air	55-40
Hard candy packing	40-35
Hard candy storage	40
Caramel rooms	40
Raw Material Storage	
Nuts (anti-insect)	65-70
Nuts (anti-rancidity)	85-80
Eggs	85-90
Chocolate (flats)	50-55
Dates and figs	75-65
Liquid sugar	40-30
Comfortable air conditioning	60-50

How to Prepare Colors

R. N. Johnson, chief chemist, Cincinnati Mfg. Div., The Kroger Co., and W. J. Miles, production supervisor, The Hilton-Davis Chemical Co., Div. of Sterling Drugs, Inc., outlined the following precautions that firms should take to obtain consistent results in the preparation of solutions from dry colors:

1. *Cleanliness.* All dissolving, measuring, and storing vessels should be clean. If washing powders or bleaching agents have been used in the clean-up, sufficient rinse water should be employed to remove them from equipment.

2. *Metals.* Contact with zinc, aluminum, iron, tin, and copper should be avoided. When color solutions contact copper they turn dark. Some metals form insoluble lakes with dyes. Others reduce dyes, making them weak. Ideal equipment is glass or enamel-lined ware, stainless steel or Monel units.

3. *Water.* Hard water is not suitable for dissolving colors, since minerals present in it form insoluble lakes with the dyes and deposit as sediment. Softened or distilled water should be used. Water treated with chlorine will destroy dye strength because of bleaching action.

4. *Preservation.* Unless effective preservatives are added, molds will grow in color solutions, thus fading them or forming sediments. Usual preservative used is 0.1 percent of sodium benzoate in the presence of citric acid to give a pH of 3.0-3.5.

5. *Weighing.* Suitable scales should be employed to assure accurate weighing.

Of interest to confectioners was The Kroger Co.'s specifications on proportioning of dyes used in the preparation of its liquid colors:

Red No. 6505—Add 8.3 oz. FD&C Red No. 1 (Ponceaux 3R) to 1 gal. of water.

Green No. 9502—Add 2.4 oz. FD&C Yellow No. 5 (Tartrazine), 1.8 oz. FD&C Green No. 1 (Guinea Green), and 0.2 oz. FD&C Orange No. 1 (Orange 1) to 1 gal. of water.

Violet No. 2501—Add 0.5 oz. FD&C Blue No. 1 (Brilliant Blue), 1.4 oz. FD&C Red No. 3 (Erythrosine), and 1.6 oz. FD&C Red No. 2 (Amaranth) to 1 gal. of water.

Yellow No. 4508—Add 4.75 oz. FD&C Yellow No. 5 (Tartrazine) to 1 gal. of water.

Orange No. 5502—Add 5.5 oz. FD&C Yellow No. 5 (Tartrazine), 2 oz. FD&C Red No. 1 (Ponceau 3R), and 0.5 oz. FD&C Red No. 2 (Amaranth) to 1 gal. of water.

Orange Circus Peanut—Add 1 lb. FD&C Yellow No. 6 (Sunset Yellow) to 1 gal. of water.

Yellow Circus Peanut No. 4516—Add 6 oz. FD&C Yellow No. 6 (Sunset Yellow) and 6 oz. FD&C Yellow No. 5 (Tartrazine) to 1 gal. of water.

Amounts of the above liquid colors used by Kroger in batches of various confections were given as follows:

For gums and jellies (600-lb. batches): 10 fl. oz. of Red No. 6505, 5 fl. oz. of Green No. 9502, 10 fl. oz. of Violet No. 2501, 8 fl. oz. of Yellow No. 4508, or 8 fl. oz. of Orange No. 5502.

For creams (500-lb. batches): 6 fl. oz. of Red No. 6505, 4 fl. oz. of Green No. 9502, 8 fl. oz. of Violet No. 2501, 6 fl. oz. of Yellow No. 4508, or 6 fl. oz. of Orange No. 5502.

For panned candies (1,000-lb. batches): 42 fl. oz. of Red No. 6505, 6 fl. oz. of Green No. 9502, 10 fl. oz. of Violet No. 2501, 15 fl. oz. of Yellow No. 4508, or 15 fl. oz. of Orange No. 5502.

For marshmallow candies (1,000-lb. batches): 30 fl. oz. of Green No. 9502, 20 fl. oz. of Yellow Circus Peanut No. 4516, 30 fl. oz. of Yellow No. 4508, or 30 fl. oz. of Orange No. 5502.

Color Problems Solved

Here are seven color problems and how they were solved by Kroger:

1. Panned, violet-colored marshmallow duck eggs became black-specked. Investigations revealed that the specks were undissolved color particles. The problem was corrected by eliminating the blue color from the formula and slightly decreasing the concentration of the other colors.

2. Complaints were received on the washed-out appearance of gum drops. Tests indicated that pink gum drops faded and became almost white, thus giving an assortment a lighter overall color. The pink color principally contained erythrosine, which was not light stable. The gum drop color was then changed to a more stable light red.

3. Difficulties were encountered in obtaining uniform color in butterscotch waffles when paste dyes were employed. In consultation with a color manufacturer, Kroger worked out a very concentrated butterscotch color. Required was the addition of only ¾ oz. of this paste dye to a 100-lb. batch on a slab.

4. A similar problem was also faced when it became difficult to get a uniform color for the blue jacket on crystals mints with the use of a plastic dye. This problem was licked by substituting a very concentrated solution of Blue No. 1 for Blue No. 2.

5. On cold mornings, it was difficult to prepare orange-colored solutions. Orange No. 1 was used. It was not very soluble and it gave a muddy-gray color. By blending Yellow No. 5, Red No. 1, and Red No. 2, greater solubility was attained, with the result that the product had a more brilliant finish.

6. The color for Circus Peanuts was not satisfactory, since the colors—Yellow No. 5 and Orange No. 1—would come out of solution. Moreover, the blend was expensive due to the large amounts of colors needed. Now, a straight Yellow No. 6 color is employed because of its solubility.

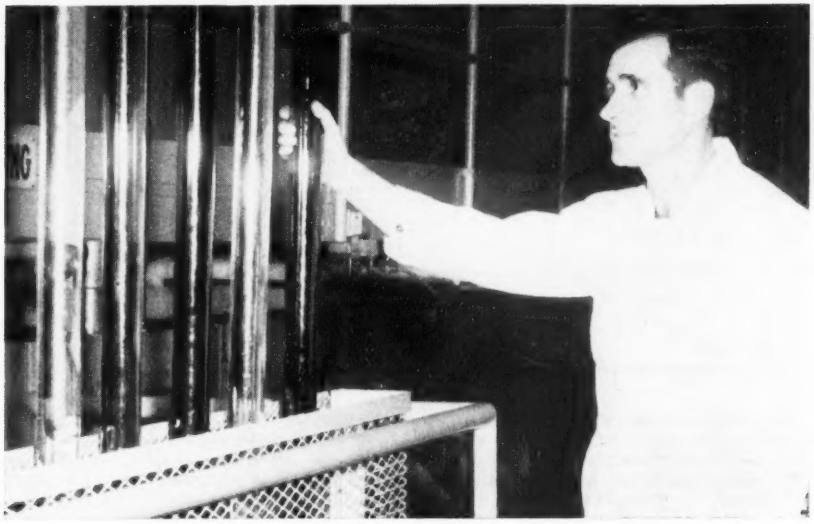
7. Considerable inaccuracies were encountered in measuring color solutions in the cooking area. Small bottles are now being used, each holding sufficient color for a batch. These bottles are washed, filled, labeled, and dispensed by personnel in the flavor room.

Better Chocolate Gloss

Nelson R. Easton, of The Institute of Research, Lehigh University, reported on tests conducted to improve the gloss of chocolates treated with the fat-bloom retardant or modifier blend of sorbitan monostearate and polyoxyethylene sorbitan monostearate. Results indicated longer tempering of modified chocolate at lower temperatures than standard chocolate. Excellent gloss—even better than standard samples—was obtained by tempering half of the modified chocolate to 82 deg. F. and then adding

(*Turn to page 184*)

A SPECIAL FOOD ENGINEERING REPORT



Glass lines are now carrying wines in bottling plants

DESSERT WINE PROGRESS

Application of modern industrial, mass-production technics, coupled with use of advanced equipment, has brought to California wineries improved quality, better sanitation, and higher operating efficiency

HAROLD W. BERG and GEORGE L. MARSH

Respectively, Associate Specialists, California Agricultural Experimental Station, and Associate Professor, Department of Food Technology, University of California, Davis, Calif.

Engineering advances are today transforming the ancient art of dessert wine making into a modern, efficient processing industry.

First off, this report covers the most recent outstanding developments—those which have gained for the wine market the following:

▶ **Improved quality via modern control equipment . . . Better sanitation through use of up-to-date materials of construction in both the plant and equipment . . . And lower costs by virtue of operating economies and efficiencies of modern mechanized production units.**

Second, pointed consideration will be given here to the new technics now foreseen as shaping additional progress in the immediate future.

Operations of several front-rank wineries have here been selected as examples because of the progress they represent in promoting wine quality and beneficial economic values.

Now to our story: The latest advances in making dessert wines have been incorporated in the process following the crushing of the grapes: Screening the pomace and pumping the must (crushed grapes and juice) into process; preparing the distilling material; increasing the use of automatic controls (as in brandy distilleries); mechanizing materials handling in bottling and casing; and disposing of stillage and pomace.

Each of these will be taken up in the order given—that is, in relation to their place as unit operations in the winery flow.

Thus, the first advance—one made at Italian Swiss Colony Winery—is adoption of a stainless steel separating screen. This unit separates pomace (skins and seeds) from the juice of both red and white grapes. The screen, 24 in. wide by 80 ft. long, is located at the bottom of a trough.

A drag type conveyor moves the must over the screen, gently separating a predetermined amount of juice from the

A Modern Wine Line in Action

—is portrayed in this month's colorful FE Picture-Flowsheet. Titled "How Dessert Wines Are Made Today," this 4-page foldout depicts the advanced operations of the Italian Swiss Colony Winery. Just turn to pages 120-123.

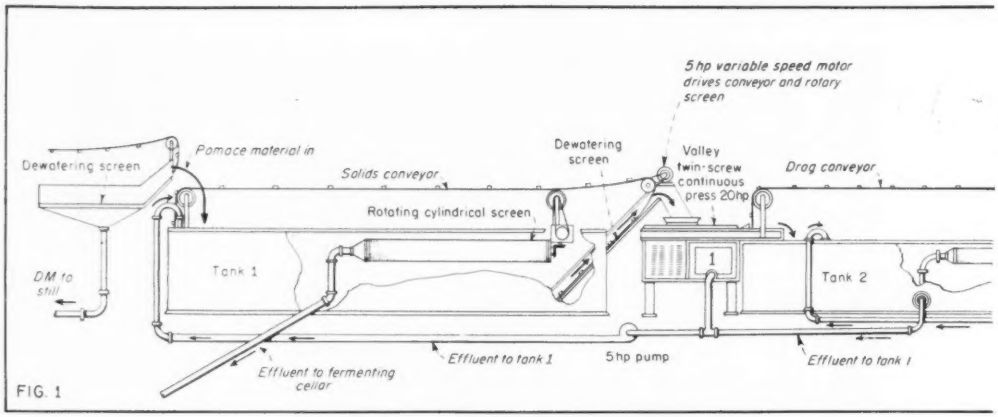


FIG. 1

pomace. The screen is comprised of stainless steel plates with $\frac{1}{16}$ in. perforations on $\frac{3}{4}$ in. centers.

Juice drops into a trough below the screen and is pumped to fermenting tanks. Pomace is carried to the end of the screen by the conveyor, then drops through a chute to disintegrators. Or, if previously disintegrated, it bypasses these units and falls into a sump.

It is then mixed with water and pumped to fermenters to become distilling material. By using a highly efficient, permanent pipe system through which to pump wines and distilling material, this winery has attained a marked improvement in sanitation.

The advantages of this separating screen are tied in with those of the continuous color-extraction unit in operation at this winery. Makers of red port face the problem of retaining at least 50 percent of the sugar content of the grapes and, at the same time, extracting as much color as possible. The conventional method requires a short-time fermentation, and the same limited time for the color extraction period. This is accomplished by "punching" (withdrawal from the bottom and pumping over pomace cap) as often as three times a day.

The fermenting tanks are usually equipped with heating coils to accelerate color extraction. This, and other prolonged heat treatment of red must, causes undesirable oxidative damage to the anthocyans present. Spectral analysis shows that when this method is used there is a decided shift of color from the desirable purplish tints to the less-wanted reddish-orange colors.

In some wineries, the same coils used for heating are subsequently employed for cooling the new wine. Other winneries use heat exchangers. It is not difficult to maintain a uniformly low fermentation temperature (approximately 76-81 deg. F.) in tanks equipped with cooling coils. The insulative quality of the thick pomace cap, retards heat radiation from the surface of the new wine below it. Another thing: During this heating and cooling treatment there are extracted from the cap some substances which then impart undesirable flavor and color to the wine below.

New Color Extraction

Continuous color-extraction from red grapes by heat exchangers is comparatively new in the wine industry. It offers these three advantages over the conventional method:

1. Increased extraction. 2. Improved quality of the wine. 3. Decreased costs of operation.

Two complete, 70-tons-per-hr. capacity, color-extraction units are used at this winery. Each is comprised of:

A tube-in-tube (3 in. inside 5 in.) regenerator consisting of 16 sections of 20-ft. copper tubes with return bends. . . A tube-in-shell heater consisting of seven 3-in. x 20-ft. copper tubes in a 24 in. dia. shell. . . A 500-gal. holding tank equipped with a propeller type, agitator, rotated at 15 rpm. . . And a tube-in-tube cooler (of the same specifications as the regenerator) enclosed in a cabinet. In the latter, efficient and rapid cooling is attained by creating an evaporative effect with water from a series of jets sprayed over the exchangers in combination with a forced-draft, provided by a 11,000 cfm. fan, located at cabinet's apex.

Red must, at 70 deg. F., is pumped through the smaller-tube of the regenerator, exiting from this unit at 135-140 deg. F. It then enters the tube-in-shell heater, and next is discharged to the holding tank at a temperature of 190 deg. F. The tank is of sufficient size to provide a 2 min. retention—an adequate period to insure color release from the skin cells.

From the holding tank, heated red must re-enters the regenerator at 190 deg. F. Now flowing through the annular tube space, it is cooled to 140-145 deg. F. by giving up heat to the counter-flowing unheated must in the center tube. Red must is then cooled to fermenting temperature (76-81 deg. F.) by being pumped through the annular tube space of the cooling unit, counter-current to a flow of cool water in the inner tube.

Total requirement for the units are: Heater, 750-850 boiler hp. steam, cabinet cooler, 500 gpm. cooling water through the center tube, which is then wasted to sewer; and sprays, 300 gpm. cooling water which is recirculated.

In studies made by the authors, it was found that use of the color-extraction unit and separating screen—

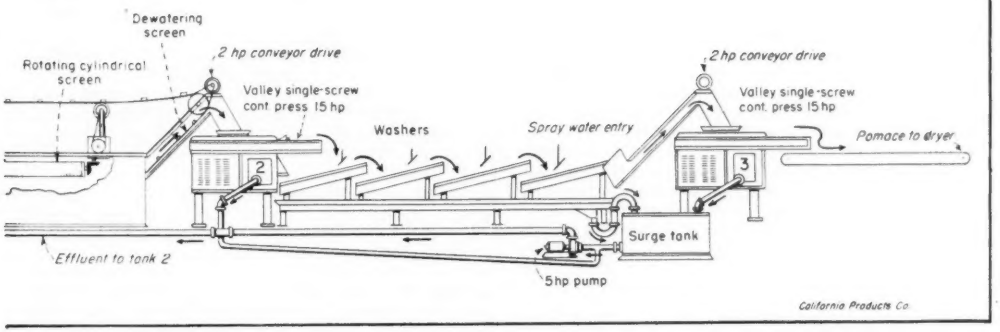
► Provides a more complete color release and retention than the conventional methods.

► Minimizes the degree of oxidation by heating in a closed system (instead of punching which permits oxygen pick-up).

► Affords a means of automatically securing the maximum color release—compared to the manual method with its element of variations.

► Releases tanks for wine and liquid distilling material fermentation (no fermenting tanks are needed for color extraction).

Remaining Sugar and Alcohol



► Simplifies temperature control of fermenting juice—since there are large heat radiation losses from the turbulent surface of fermenting juice without pomace cap.

► Realizes greater production efficiencies from these screened juices (which can be fermented at lower temperatures than juice with cap) since this new method results in lower vapor pressure for alcohol.

► Unitizes the handling of both red and white port from the separating screen through the remainder of the process.

In addition to these benefits, labor savings are gained by abolishing punching of the pomace cap. The full potentialities of these two units have not yet been exploited.

All the following could be eliminated:

The operating and labor costs involved in the disintegration of pomace; mixing it with water; pumping the distilling material into the fermenting cellar; the labor of punching and the use of fermenting tank time in which to ferment this combined pomace-liquid material.

Thus, a much higher level of sanitation could be maintained, since pomace is the greatest single contributing factor to unsanitary conditions in wineries.

To attain these desirable objectives the sugar could be washed from the pomace by combining a pomace diffuser, now in use in some California wineries, with the color-extraction and screen units. With this system, pomace from red and white grapes would never enter the fermenting cellar. Instead, upon leaving the screen it would be conveyed to the diffuser, outside the plant, where the sugar would be washed from it. The exhausted pomace would then be pressed, dried, and used for feed or fertilizer. Only the liquid DM (distilling material) would be pumped into the winery to fermenting tanks.

Recovery by Diffusion

There are several types of pomace-diffusers now in use in California wineries. Of these, the most notable is the one devised by California Products Co., Fresno, Calif.

Formerly, this plant put its pomace into screw-type expeller presses which reduced the moisture content of the material to 60-65 percent. The moisture remaining in the cake, and thus lost, usually contained from 2½ to 6 percent of the total amount of alcohol, or sugar, obtainable from a ton of grapes.

Units similar to the new diffuser employed by this plant are used by several wineries to extract the remaining sugar and alcohol from pomace. However, this plant's operating data is based on grape or raisin pomace resulting from the production of high-proof brandy only, and not wines and brandy such as would be produced in a winery.

Here are the economies and advantages to a winery:

► Processing grape pomace—Labor savings of 2 man-days, plus 1-day in fermenting tank turnover-time.

► Processing raisin material—Savings of 83 percent of the labor formerly required, and an additional 20 percent recovery of 5 percent alcohol (by volume) from the DM.

► Daily capacity of 400 tons of grapes, or 100 tons of raisin material.

► Daily provision of 120,000 gal. of 5 percent alcohol (by volume) of DM for the distillery.

► Improvement in uniformity of the DM.

► Provision of a method of sugar recovery particularly adaptable to continuous fermentation (since it is more feasible to extract sugar than alcohol from the unfermented, or partically fermented, pomace).

► Better quality pomace for stock feed, since the diffuser extracts more of the acids.

Operation Described

At this plant, fresh grapes or raisin material are fermented in tanks and the clear sugar-alcohol solution is drawn off and pumped to DM measuring tanks to complete its fermentation. The effluent produced by the pomace diffuser is then pumped over the pomace left in these fermenters. Sugar remaining in this pomace is allowed to ferment to approximately 2 deg. Balling.

The whole mass in the tank is then agitated and pumped to the dewatering screen at the entrance of the pomace diffuser (Fig. 1). A drag conveyor moves the pomace across a stainless steel dewatering screen, then drops it into the first tank of the diffuser.

The liquid flows through the screen into a trough and is first returned to the fermenting tank to be used as an aid for flushing the remaining pomace into the pump.

After the tank is emptied, the liquid is pumped to another tank, where it ferments to dryness (approximately 7 percent alcohol) and then is used as distilling material.

The liquid in the first tank of the diffuser is pumped to it from the cylindrical screen of the No. 2 tank and from the No. 1 press. These rotating screens act as constant liquid level controls. Pomace is moved through this first tank by a drag conveyor, is partially diffused, and is then

conveyed up a dewatering screen to the No. 1 press. The liquid from the dewatering screen flows back into the tank.

The pomace is now pressed from 87 to 55 percent moisture content and then dropped into the second tank, where diffusion, identical to that in the first tank, is continued. Liquid in this second tank is pumped to it from the surge tank, which is fed by the press juice from No.'s 2 and 3 presses and from the pomace washers.

Pomace from the second press is next dropped upon a series of washers, where the last traces of sugar-alcohol are washed from it by high pressure sprays. It is then finally pressed to 55 percent moisture, conveyed to a rotary dehydrator for drying to 10 percent moisture content, and bagged. It is used as a roughage supplement in stock feed.

The effluent from this pomace diffuser is pumped from the cylindrical screen in the first tank to the fermenting cellar, where it is added to other incompletely fermented pomace to facilitate fermentation. It is approximately 1 deg. Balling and 5-7 percent alcohol. The pomace, with which it is mixed, contains approximately 3-5 percent alcohol and is approximately 15-18 deg. Balling.

Handling Fermented Pomace

In selecting a method for the recovery of alcohol from fermented pomace, there are several important economic considerations. It is known that a fixed still loss of approximately 0.1 percent alcohol occurs because of the impracticality of removing the last trace of alcohol from the DM. Since this loss is fixed, the alcoholic strength of the incoming material has a decided bearing on the overall economy and recovery of the available sugar present in the original grapes.

Under presently used practices, when the fermented liquid DM is withdrawn from the pomace, approximately one-third of the available liquid is retained in the solid material. Since this remaining liquid is of the same alcoholic strength as the free-run extraction, it is desirable to extract as much as possible.

Several advances have been made recently in the handling of distilling material. However, even the wineries that show a decided trend toward developing more efficient processes, have not taken advantage of all possible engineering. No one winery has a process setup which could be termed an ideally mechanized line. But where applicable, the combination of one, or more, or these new units in present winery lines would modernize the process—making it more efficient, economical, and productive of more uniform quality.

Another winery evidencing a progressive engineering attitude is Vie-Del Grape Products Co., Fowler, Calif. It was among the first to install automatic instrumentation to control its distillery. And since that time, it has devised a fermented-must measuring tank, equipped with a new type agitator, also a continuous fermenter for free-run juice.

Solids Kept in Suspension

One of the principle problems involved in the handling of disintegrated grape pomace has been that of preventing settling of suspended solids and the clogging of valves and pipelines. Previously, slow moving, top entering, simple paddle-type agitators or air agitators have been used. But these have proved to be only partially satisfactory. Vie-Del's agitator tank brings the following advantages:

- **Clogging of lines and valves has been eliminated.**
- **Extensive cleaning of fermenting-tank bottoms at the end of each day's run is no longer necessary.**
- **Still efficiency has been increased by eliminating fluctuations due to line clogging and excessive solids content of feeds.**

This tank is a 48,000-gal., 20-ft.-dia. unit made of steel. And it has a cone-shaped bottom through which the agitator enters at the apex (Fig. 2). The tank bottom slopes toward the apex at a 10 deg. angle. The agitator is an 8-bladed turbine-type mixer of 36-in. dia. Drive is by a 10-hp. gear-reduction motor at 78 rpm.

Material enters at the top of the tank, direct from the disintegrator, and is kept in constant agitation. The effect of the turbine mixer is to pull the material down in the center of the tank and then push it out, horizontally, so

AGITATOR TANK

Holds fermented pomace in suspension

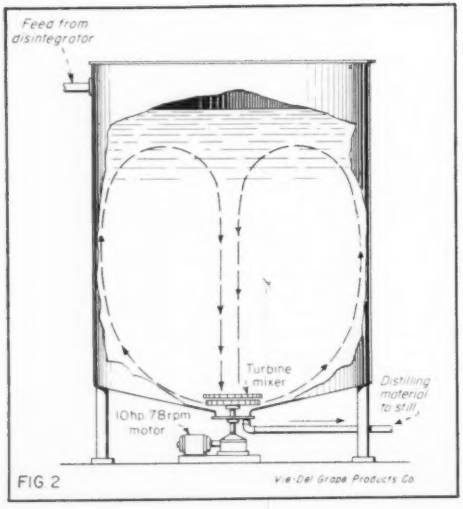


FIG. 2

CONTINUOUS FERMENTER

Produces grape brandy, distilling material

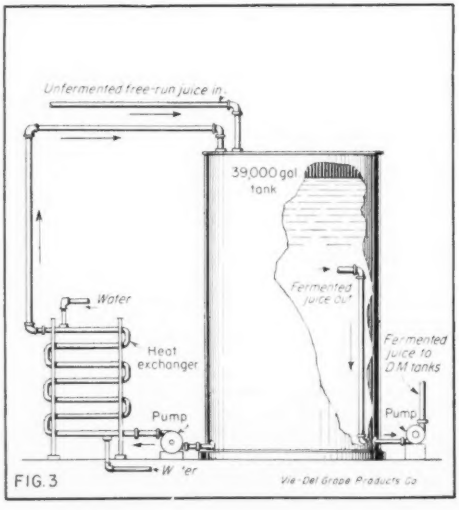


FIG. 3

that it moves up the sides of the tank. Thus there is a top-to-bottom circulation and, simultaneously, a horizontal circular motion around the tank in the direction of its rotation. Circulation is positive, but not violent.

Continuous Fermenter

Conventionally, distilling material is produced in a batch operation in tanks. The following three advantages are gained by Vie-Del with use of a continuous fermenter:

1. *Fermenting time is decreased.*
2. *Volume of throughput is increased.*
3. *DM produced is uniform and of higher quality.*

Grapes are crushed in the conventional manner, and the must is pumped to 20,000-gal. open concrete fermenters. Here, 125 ppm. of sulphur dioxide goes in immediately, then is followed by the addition of 2 percent yeast starter. In a matter of a few hours, fermentation is under way, and the free-run juice is pumped from the bottom of the tank and fed without interruption to the continuous fermenter (Fig. 3). This is a square concrete tank with 39,000 gal. capacity. It was previously used as a distilling material measuring tank. The pomace, mixed with water, is pumped to the agitator-tank.

To inhibit the growth of wild yeast, the fermentation process in this unit is initially started by filling the tank about three-fourths full of heavily sulphited juice. Then a pure yeast starter of about 5 percent is added. When this juice has dropped to about 5 deg. Balling, the continuous feed is started.

The free-run juice is introduced at the top center of the unit and the fermented DM is withdrawn from a point about half way up the side and pumped to 60,000-gal. DM measuring tanks, and thence goes to the still.

To maintain a desirable temperature, fermenting juice is continuously withdrawn, from a valve at the bottom side of the tank, pumped through a heat exchanger, and then back into the top center of the tank. In this exchanger, it is cooled with water at a rate to maintain a temperature not over 85 deg. F. in the tank. Control of this temperature also practically eliminates the possibility of undesirable bacterial action in the material, and also increases the fermentation efficiency.

No detailed data is available on this operation, but spot checks and total gallonages indicate that the average feed rate is from 2,000 to 2,500 gal./hr. The entering free-run juice averaged 22 deg. Balling, and that of the fermented material exiting approximated 3 deg. Balling.

Under plant conditions, feed rates vary considerably, but there has been no discernible bad effects from such variation. There is, of course, a corresponding variation in the Balling degree of the material withdrawn.

The process has been in action for as long as three weeks without cleaning or restarting, and no decrease has been found in the quality of product. Volatile acids are low (.020 to .025).

Another advanced method for producing fermented DM is in use in California wineries—the Metzner De-Alcoholizer (Fig. 4). This unit has been in use for a longer time than the pomace diffuser and Vie-Del's continuous fermenter.

It is employed only for the stripping of alcohol from either drained or pressed pomace. While its chief advantage is the complete removal of alcohol contained in the pomace, the resultant product is a low-proof alcohol (20-40) requiring rectification in a standard brandy still.

Pomace is conveyed directly to this unit from the fermenting tanks or press and is not washed—thus increasing tank turn-over time and contributing to more economical operation costs. The overall recovery is large. For the alcoholic strength of the material provided by this unit is high, while the fixed distillation loss in the conventional still to which it goes is low.

The unit is comprised of four or more perforated plates across which screw conveyors move the pomace. Steam is introduced at the bottom and passes through the perforated plates of the successive stages, distilling the alcohol from the material. The vapor is condensed in a water-cooled condenser located at the top of the unit. This low-proof alcohol is then processed in a conventional brandy still.

Pomace is fed in through a screw-feed, which forms a seal and prevents the escape of alcohol vapor. It exits from the bottom of the unit and is subsequently made into byproducts.

In recent years, the most outstanding engineering progress in brandy distilleries has been the utilization of automatic instruments, such as flow controllers and recorders. They enable smooth column operation for the distiller, with resulting benefits in higher recovery efficiency and more uniform quality in the brandy end-product.

Although pot stills continue to be used to a limited extent, most of the high-proof brandy is now made in continuous stills, such as those employed at Italian Swiss Colony and Vie-Del. One of the most highly instrumented stills is operated at the latter winery Fig. 5 (next page).

Instruments Control Flow

The problem of controlling the distillation of a brandy is largely one of stabilizing flow conditions throughout and the prevention of undesirable changes. Any variation of the still equilibrium required 30 to 60 min. for correction. During this time, the quality of the product falls off considerably, proof varies widely, and fusel oil content increases markedly.

The automatic control of a brandy still lies in continuous and imperceptible adjustments of the instruments—rather than in a swift, drastic control action to correct wide fluctuations after harmful operating results have become evident.

The two key flows, automatically controlled at Vie-Del, are the continuous charge of raw material (wine) to the still, and the movement of heating steam to the stripping column. Both of these flows are satisfactorily controlled

DeALCOHOLIZER

Strips alcohol from drained or pressed pomace

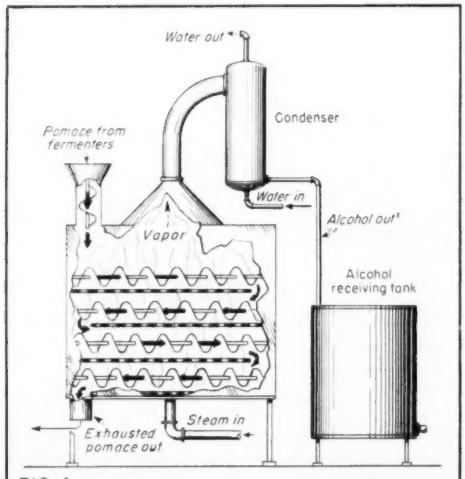


FIG. 4 Mission Bell Winery

by conventional differential controllers, which operate diaphragm motor valves to keep them within desired limits.

There are five indicating rotameters which measure the flow rates of materials leaving the still—aldehydes and fusel oil draw-off, fusel oil dilution water, singlings (returned to the column), and the finished product.

Another device which stabilizes flow within the still is the reflux control—actually a level regulator. Installed on the base of the rectifying column, it regulates an air-operated valve on the discharge side of the reflux pump. A middle-temperature controller operates a diaphragm motor valve on the main product line and will vary the rate of product removal to maintain the position of the break-point (the exact location where two volatile liquids best separate in the still).

Cooling water, which flows in series through the brandy cooler, condenser and dephlegmator, is kept at a uniform temperature for efficient operation by a temperature-sensitive instrument bulb in the water outlet line from the dephlegmator. The instrument positions a diaphragm motor valve that determines the rate of water discharge.

Flexibility in Bottling

Of major importance in the engineering design of a wine bottling plant is mechanical flexibility. Ordinarily, the large winery uses gallon, ½ gallon, 4/5 quart, pint, ½ pint, and miniatures in several mold-types of bottles.

High speed lines handle the most popular size bottles (such as the 4/5 quart), and will also fill, cap, and label any of several other standard size bottles. Semi-automatic lines are used almost exclusively for packaging miniatures and special mold-type bottles, which are either infrequently run or do not lend themselves to high-speed operation.

The bottling department of the Wine Growers Guild, Lodi, Calif., is equipped specifically to handle certain bottle sizes and shapes at a rated wine volume. This plant is not a winery. Instead, it was engineered to receive, store, blend, package, and ship approximately 8,000,000 gal. of wines annually as a reasonable maximum capacity. Member wineries of the Guild deliver wines by tank truck and railcar to this central blending and bottling plant.

Provided is a storage tank capacity of 2,500,000 gal. in a plant covering a 900,000 sq. ft area. Stainless steel and glass pipe lines, fittings, and pumps are used in moving the finished product except on those connections necessitating the use of hose. A constant pressure of 40 psi. is maintained in these lines. All equipment operates on electric controls, and interlocking switches and overload devices shut down the operation in the event of trouble.

To permit a monthly production of 250,000 cases of various sizes of bottled wine, five bottling lines were designed for this plant. Three of these are high-speed and fully automatic. For flexibility, the other two are semi-automatic.

Wine to be bottled is pumped from the storage cellar into one of five "Tax Paid" tanks. Here, it is gaged by a U. S. Stockkeeper Gager, who determines the amount of Federal tax. The product is then pumped to one of 13 tanks located in the bottling room.

Wines are pumped from these tanks through polishing filters and heat exchangers, then go through Pyrex glass lines to the filling machines (see lead photo). Dry wines are pasteurized, while dessert wines are merely warmed to room temperature. Wine intended for bottling must be warmed to eliminate the formation of dew on bottles, which would make labeling difficult.

The glass lines are fitted with surge chambers to elimi-

(Turn to page 209)

INSTRUMENTATION

Control of flow in this brandy still is stabilized by action of instruments

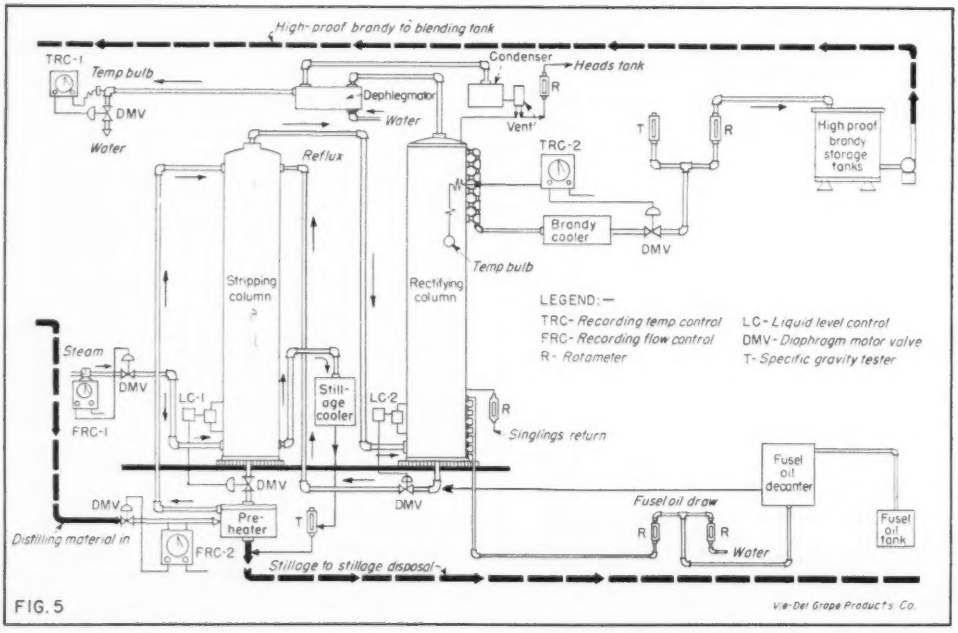
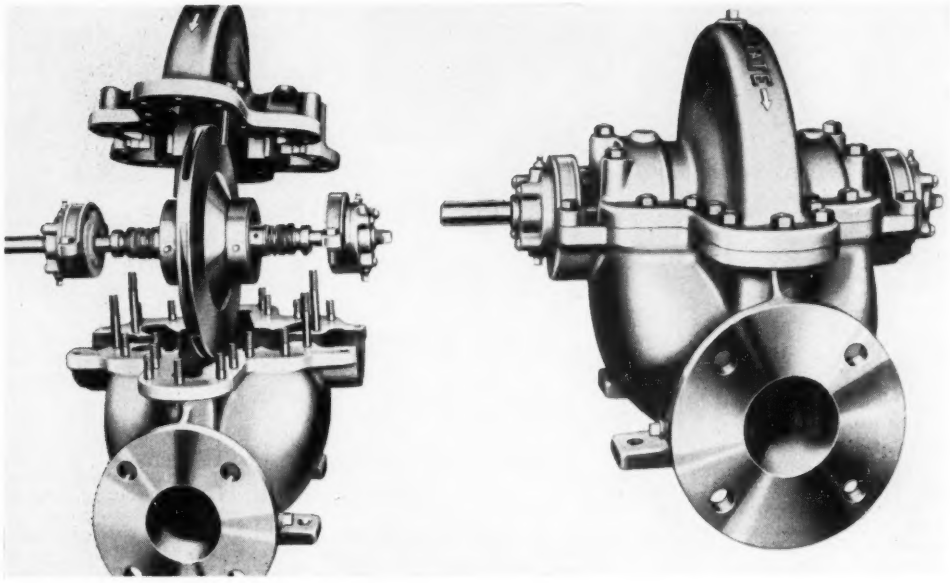


FIG. 5

Via-Del Grape Products Co.

NEW EQUIPMENT & SUPPLIES



Compact Split-Case Pumps Are Easily Serviced

Savings in floor space, shorter shaft lengths, improved performance characteristics, and easier servicing are features reported for a new line of split-case general-duty pumps.

Designated Peerless Type AS, pumps are available in discharge sizes from 1½- through 4-in. Capacities range to 750 gpm.; heads to 230 ft. General application is for pumping water and clear liquids up to 200 deg. F. where no solids are in suspension.

Use of standard mechanical seals, states maker, enables incorporation of a pump shaft that is but one half the length conventional in pumps of this size. This shorter shaft, more rigid and with reduced deflection, is reported to provide smoother, quieter operation and longer life for bearings, seals, and wearing surfaces. Seals used are available from standard sources of supply.

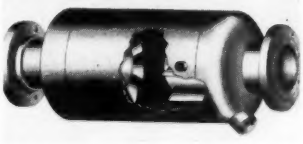
In this design, use of the seals has also eliminated stuffing box housings. The new pump occupies approximately one-half the usual floor space. Benefits from reduced size include better accessibility to piping, control equipment, and valves.

Horizontal, split-case design permits simple removal of top half of pump case for inspection and maintenance of rotating elements. Entire rotating element lifts from case for inspection, repair, or replacement. Rotating element can then be disassembled very readily with use of ordinary tools.

All types of drives are available with new pump, including direct-connected electric motor, gasoline engine, and steam-turbine drive. Manufacturer intends to have these pumps available for quick shipment from its factories at Los Angeles and Indianapolis. — *Peerless Pump Div., Food Machinery & Chemical Corp., 301 West Ave. 26, Los Angeles 31.*

Circle 101A on Reader Service Card

Vapor Purifier Removes Most of Entrainment



This line-type Hi-eF purifier is designed to remove a very high proportion of entrainment from vapor lines.

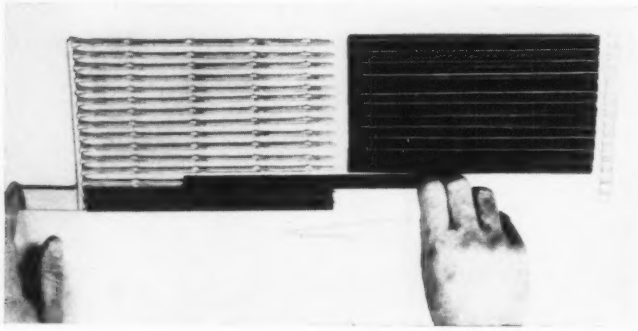
Upon entering purifier at inlet, laden vapor receives a rapid rotating motion, causing the heavier entrainment to be thrown outward to the walls of the purifier and is ejected.

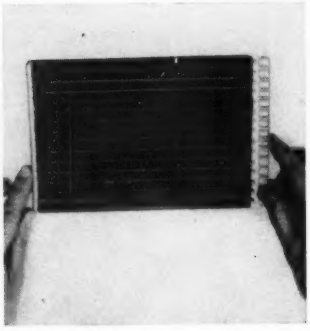
Units do not require servicing, states maker, since they contain no moving parts and are self-cleaning. Other important features: Reduction of pressure drop to a minimum, large slug capacity, and a broad range of capacities.

Principal uses: (1) to remove oil and generally cleanse steam, (2) to remove condensate from compressed air lines, (3) to prevent process gas and air lines from becoming contaminated with line scale and liquids, and (4) to remove entrainment from vapor lines following evaporation. — *The V. D. Anderson Co., 1935 West 96th St., Cleveland 2.*

Circle 101B on Reader Service Card

Grid, Tube Sealer Extend Battery Life, Strength





Both high capacity and life of batteries are stated to be prolonged by six improvements incorporated in the Exide-Ironclad industrial storage batteries used for heavy duty service.

The two foremost changes are: A new silver alloy grid metal (left) and a non-corroding permanent positive-plate tube sealer (right).

Corrosion of the positive-plate grid is one of the leading causes of battery failure. Introduction of Silvium, a new alloy, in the construction of the positive-plate grid is reported to reduce the corrosion factor and assure a longer positive-grid life. Silvium is an alloy of silver, lead, and other components, found highly resistant to corrosion.

Another cause of curtailed battery life is loss of active material from the positive plate. This also threatens short circuits within the battery due to "sediment" accumulation of the active material.

To avert this, the new grid is made up of metal core rods inserted in slotted hard rubber tubes. Active material is then packed into the tubes surrounding the rods. The slots in the tube permit free access of the electrolyte to the active material, but they are fine enough to prevent it from washing out.

Initially, the bottoms of the tubes were sealed with an alloy bar. However, corrosive action on this metal would eventually breach the seal, then active material would seep out.

Now a replacement has been found. Molded in a single bar of polyethylene, a plug for each tube projects to seal it safely at bottom.

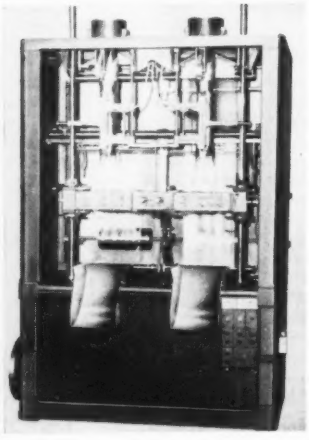
This new tube sealer is non-corroding, and it is not affected by the electrolyte or electrolytic action, thus holding its shape and remaining intact.

In addition, polyethylene is an insulating material. Extending across the entire bottom of the plate, it acts as a safeguard against shorting between plates. Also, elimination of metal at bottom of positive plates assures better negative-plate performance because of low local action and reduction or elimination of shedding of active material.

Other improvements in battery are new homogeneous sealing compound; a seamless shock-proof jar; unbreakable plastic vent plugs; and a corrosion and impact-resistant plastic steel tray coating. — *The Electric Storage Battery Co., P. O. Box 8109, Philadelphia 1.*

Circle 102A on Reader Service Card

Machine Extends "One-Step" Packaging



This new model C unit is designed to broaden the field of automatic one-step packaging. Larger items and bigger quantities than those now packaged by the older Models A and B machines, as well as such products as dried fruits and vegetables, pretzels, and crackers, are readily handled by this automatic packager.

At present, machine makes a pillow type package up to 13¼-in. long and 9½-in. wide, using cellophane or polyethylene. It is adaptable to other packaging, including laminated heat-seal materials, as well as other package styles according to demand.

Features of machine are its versatility in feeds, the use of hydraulics to permit a more compact design, simplicity in adjustments, and operation.

Feeds available for this model are the volumetric turret-plate, auger, and a new, accurate scale unit that is being especially built. An important feature here is regulation of machine cycle to scale cycle to attain maximum accuracy in finished package.

Although considerably larger, new machine will require little more floor space than present Models A and B. Hydraulic actuation of photo-electric regulator further reduces operation and maintenance problems. Entire machine is enclosed in enamel paneling, with easy access to all working parts and adjustments.—*Transparent Wrap Machine Corp., Route 17 and Henry St., Hasbrouck Heights, N. J.*

Circle 102B on Reader Service Card

Cuts Loss of Liquid-Absorbent in Air Conditioning

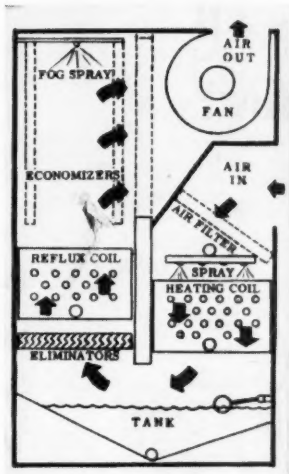
Consumption of liquid absorbent in controlled-humidity air conditioning is stated to be drastically reduced through use of a new concentrating principle.

The absorbent employed is Hygrol, which has hygroscopic properties that afford control of relative humidity of the area conditioned.

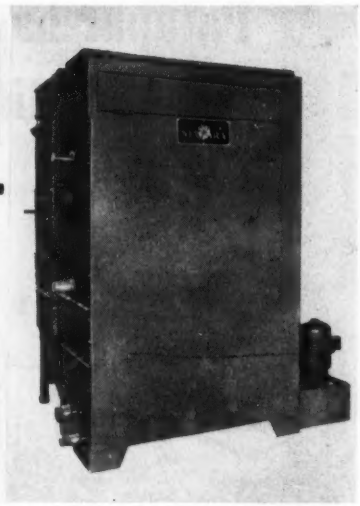
In new model conditioner (photo), the diluted liquid is sprayed into an air stream over a heating surface which raises temperature of the air, evaporating the water from it. Air stream then passes through eliminator plates, which remove the liquid drops.

Then, in a second stage, the air passes over a cooled reflux coil that raises the relative humidity in the chamber, condensing the absorbent vapor. In the third stage, it passes through filtration cylinders—the "economizers"—each of which contains a fog nozzle.

Here, the build up of very high humidity completes the condensation of the absorbent liquid, and its droplets are caught by filters while moisture laden air passes through. Reconcentrated absorbent drains to tank in base, from which it returns to air conditioning unit, completing cycle.



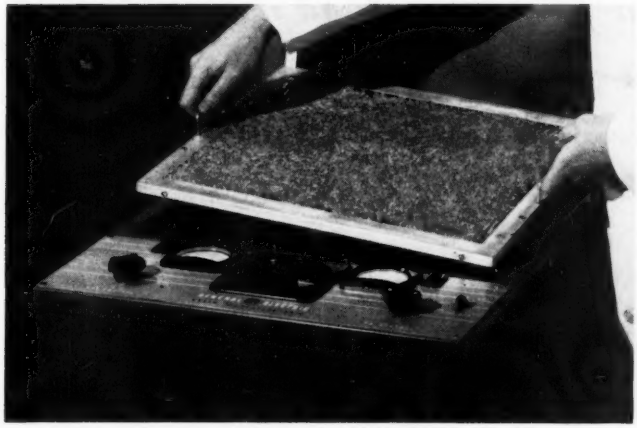
Flow Diagram



Maker claims that using this patented method in one installation where the charge of liquid was 2,000 gal., there was no measurable consumption of liquid in 168 hr. continuous operation.—*Niagara Blower Co., 405 Lexington Ave., N. Y. C. 17.*

Circle 103A on Reader Service Card

X-Ray Machine Reveals Infestation in Grains



This new X-ray unit provides millers and agricultural research personnel with an improved method of inspecting the condition of grain.

X-ray is reported to provide the simplest means for positive visual identifications of infestation. Recent work is stated to have demonstrated its advantages over previous methods for observing the degree of checking in grain and effectiveness of fumigation.

New unit is similar in size and appearance to a one-burner cooking range. When cover of unit is opened, a tray bearing a grain sample is set on top of cabinet. X-ray film is then placed with its holder on under side of cover, and cover and film are closed down over tray of grain.

From tube located in base, rays shine up through grain and expose film. Then shadow picture reveals internal condition of grain.

Heart of new unit is beryllium-window X-ray tube which transmits the "soft", less-penetrating radiation required to examine low-density material such as grain.

Unit is self-contained, shockproof, and safety shielded. Apparatus operates at 25,000v., .005 amp's from an ordinary 100/130v. 60-cycle current source.—*General Electric Co., 4855 Electric Ave., Milwaukee 14.*

Circle 103B on Reader Service Card

Patapar has all those qualities?

Unless you test it yourself, you might think it impossible that Patapar Vegetable Parchment could have so many unique qualities—high wet-strength, grease-resistance, boil-proofness, tasteless, no lint or fuzzy fibres, and beautiful texture for printing.

Patapar protective food wrappers

Plain or beautifully printed in one or more colors, Patapar is perfect for packaging and protecting butter, bacon, poultry, celery, lard, ice cream, margarine, ham, cheese and many, many other products.

For samples, tell us the use you have in mind so that we can send you the correct type of Patapar *(there are 179 different types).*

This Keymark, nationally advertised symbol of wrapper protection, can be included on printed Patapar wrappers.

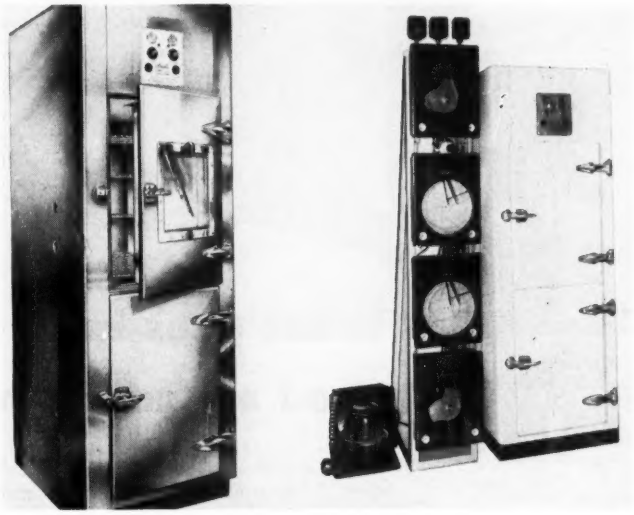
Patapar
Vegetable Parchment
HI-WET-STRENGTH · GREASE-RESISTING
Paterson Parchment Paper Company
Bristol, Pennsylvania
West Coast Plant: 340 Bryant St., San Francisco 7
Sales Offices: New York, Chicago
Headquarters for Vegetable Parchment since 1885

Lab Cabinet Has Wide Controller Coverage

Fully automatic all-electric laboratory cabinets, having selector temperature range from room up to 180 deg. F. have been announced. Relative humidity may also be selected to 96 percent.

At right in photo is seen cabinet equipped with: Two-pen dual elective controllers and also integral time-pattern controllers (Brown); blower cooler with ½ hp. capacity condensing unit; and expansion valve and pressure control. Temperature, humidity, and cooling controls are air-operated for positive modulating action. Variable cams automatically regulate rise and fall of temperature and humidity and length of cycle at predetermined settings.

Maker states temperature can be lowered to 30 deg. F. without abnormal icing of coils. Two-way switch on air conditioner, with toggle down, develops 1,200w. in heating coil for temperatures up to 150 deg. F., and with toggle up cuts in an additional heating element to develop 1,800w. for increases in temperature up to 180 deg. F.

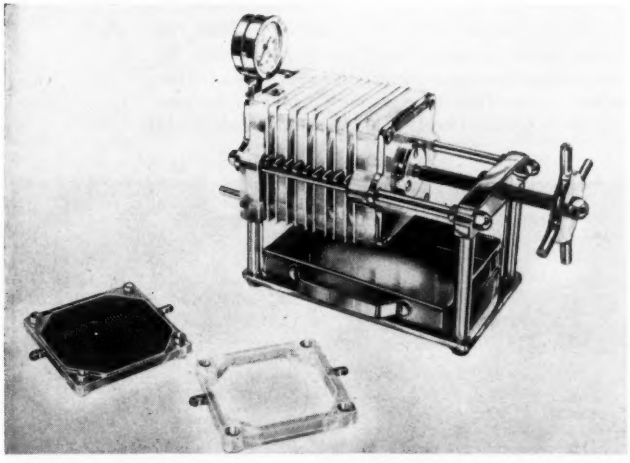


Inner cabinet, door liners, air conditioner ducts, electrical heaters, steam generator, water feeder, and other parts, are fabricated of stainless steel.

Another model cabinet (left) has door with exterior and interior glass and a conventional automatic wiper on the interior glass. Heavy molded rubber gaskets are fitted to seal doors. Wall, ceiling, and doors have full 3-in. insulating core. — *Anetsberger Bros., Inc., 165 N. Anets Drive, Northbrook, Ill.*

Circle 105A on Reader Service Card

Filter Uses Clear Plastic Disks



Visual study of the filtration cycle —opening new avenues of research— is now possible with use of transparent Lucite plastic in a new, small, multiple-disk laboratory filter. And double filtration can be achieved with a dividing head, where this is desired.

Filter comes in two sizes: 4-in. square with approximate filtration area of 11 sq. in. per sheet and 8-in. square with 52 sq. in. per sheet.

Also, there is a choice of circulatory systems: (1) With all parts coming in contact with liquid made of Lucite; (2) with such parts of Lucite with stainless steel screens; and (3) with all circulatory passages of stainless steel.

The stainless steel model is recommended for handling liquids where temperatures are above 120 deg. F. and where sterilization is required.

New filter is easy to clean, screens are simple to remove, and units are light in weight. The 4-in. model requires approximately 1 sq. ft. of space. Complete closure is effected by a single handle.

Asbestos filter sheets in grades No. 1 to 9, plus grade E-O pyrogen and bacterial retentive sheets, are available for both size filters.—*Ertel Engineering Corp., Kingston 11, N. Y.*

Circle 105B on Reader Service Card

The Carrier System Weathermaker, a compact fan-coil air conditioner for central system applications, is available in vertical and horizontal models.

What goes into good air conditioning?

Good equipment, naturally. But we think that's only half the story. The other half is good dealer engineering.

For example, take our System Weathermaker. Its unique sectionalized construction permits a wide variety of unit combinations to meet individual job space requirements.

Good? There's nothing else like it for compact, central system air conditioning using ducts for air distribution.

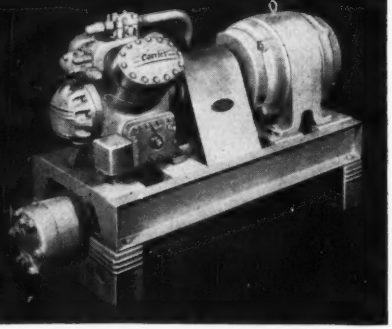
And here's where the Carrier dealer comes into the picture. He *knows* air conditioning. He knows how to utilize this sectionalized construction in terms of your needs. His experience plus our product produces the kind of air conditioning that's easily installed, technically suited to the job, and completely dependable.

Remember that Carrier offers a full line of products, all matched in size, performance and quality to work together. So whatever your air conditioning or refrigeration needs, your Carrier dealer is the man to see. He's listed in your Classified Telephone Directory. Or write Carrier Corporation, Syracuse 1, New York.

Carrier

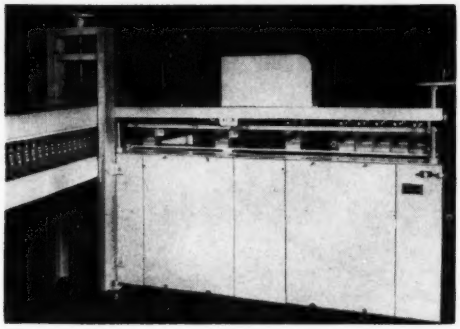
AIR CONDITIONING
REFRIGERATION
INDUSTRIAL HEATING

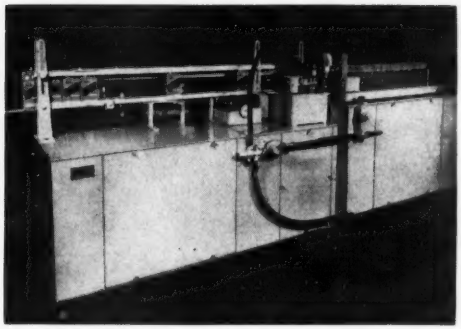
The Carrier Evaporative Condenser, an economical accessory where water is costly or limited. Indoor or outdoor installation.



The compact Carrier Refrigerating Compressor, for all types of air conditioning and commercial refrigeration applications.

Seals Cartons at 65-Per-Min. Rate





Retail-size cartons are handled at the speed of 65 a minute by this new, automatic sealer assembly.

Machine comprises two separate units: A bottom sealer (right) complete with automatic feed and carton magazine, and a top sealer (left) that includes a compression or drying section. Units may be used together or individually for operations where only the bottoms or tops of the cartons are to be glue-sealed.

According to maker, the unit rate specified can be obtained with one operator assigned to keep the bottom sealer's carton magazine filled. No operator is required for running the top sealer.

Simplicity of machine permits fast changeover from one size to another. Time required is approximately 15-20 min. for both units.

Machine is designed to handle sizes from a small gelatin-type carton on up to a "family size" container, with no added parts needed.—*J. B. Bellamy & Co., 107 Main St., San Francisco 5.*

Circle 107A on Reader Service Card

Provides Standard Unit for Paper-Strip Analysis

There's no more need for using awkward, makeshift equipment in strip-paper analyses. For a standardized chromatography assembly is now available.

It has long been known that solutes migrate through filter paper by capillary action—as observed when one end of a paper strip is dipped in a dye solution. As a result, "paper chromatography" was born, a unique method of analysis with excellent resolving power.

Included in the new apparatus are a stainless-steel support rack to hold the strips, a glass tray and Petri dish for the solvent, and glass rods for attaching and holding the strips. Entire apparatus fits into a large cylindrical Pyrex brand glass jar, 12 in. o.d., and an outside height of 24 in. This closure makes possible the saturated atmosphere required for optimum analyses.

Desired atmosphere of saturated solvent vapor is further maintained by a glass cover plate with a stoppered ¼-in. hole in center for adding solvent without lifting the entire top and disrupting equilibrium.

Apparatus can be put to use immediately even by a worker unaccustomed to this method of analysis. He merely places one drop of each sample near the top of an individual paper strip and hangs the strips from the support rack (drops at top). Upper edges of strips are curled to dip into a 5½-by-4 in. trough, and solvent is added to this trough after the jar's atmosphere has become saturated from the lower dish.

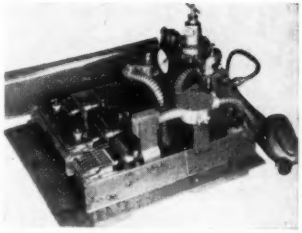
When capillary action moves solvent down strip, components of original drops separate vertically. Determinations depend on the relative positions of the resultant streaks.

For constituents not naturally colored, identification is frequently accomplished by streaking the "chromatograms" with a staining material like potassium permanganate, ammonia, or hydrogen sulfide. This may also be done by fluorescence under ultraviolet radiation.

Not only is this a speedy way to separate complex mixtures into their components but the kinds of materials that can be analyzed are most diverse: Inorganics, ionized organics, substances of small or large molecular weights, and natural and synthetic organics ranging from hydrocarbons to proteins.—*Fisher Scientific Co., 717 Forbes St., Pittsburgh 19.*

Circle 107B on Reader Service Card

Unit Automatically Codes Multi-Wall Paper Bags



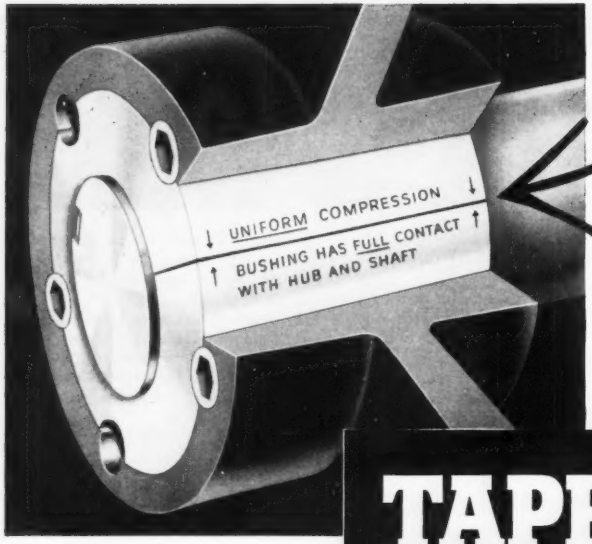
Tops and bottoms of multi-wall paper bags can be serially numbered and coded with this automatic imprinting machine.

Built for mounting in either horizontal or vertical position, machine is electrically controlled, air-operated, and has self-inking mechanism. Length of imprint can be as much as 12 in.

Both of operator's hands are free to pre-position bag for imprinting. Action consists of placing bag between printing die face and plate and the actuating foot-trip switch. Once started, machine goes through complete printing cycle.—*The Industrial Marking Equipment Co., Inc., 454 Baltic St., Brooklyn 17.*

Circle 107C on Reader Service Card

Here's the Big Difference!



TAPER-LOCK

–The Sheave that always runs true!

The Taper-Lock bushing seats evenly along the entire length of the hub. It is self-seating. There is no collar—no protruding part—no flange to prevent uniform compression.

With full contact, Taper-Lock sheaves run true. Made of finest grade of close-grained semi-steel, cast in the Dodge foundry. Precision grooves have identical pitch diameters so that every belt can pull its share of the load.

Sheave and bushing mount as a unit—easy to align on the shaft. Grips the shaft like a shrunk-on fit. Flush hub means safety.

THERE IS ONLY ONE TAPER-LOCK (a patented product of Dodge). Available from distributors' stocks in a complete range of sizes in A-B combination, B, C and D grooves. Also ask your distributors for Dodge Sealed-Life V-Belts. WRITE for complete data.

DODGE MANUFACTURING CORPORATION, 2800 Union St., Mishawaka, Indiana

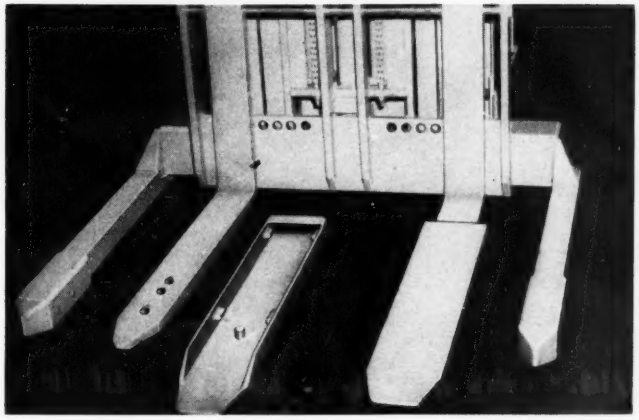
DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER

your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book.

Fork Extensions Simplify Handling



With use of new telescopic fork extensions on their lift trucks, storage plants and warehouses carrying numerous items can now handle both large and small pallets efficiently.

Light bulky loads can best be handled on large pallets while heavy materials can be stowed on relatively small ones.

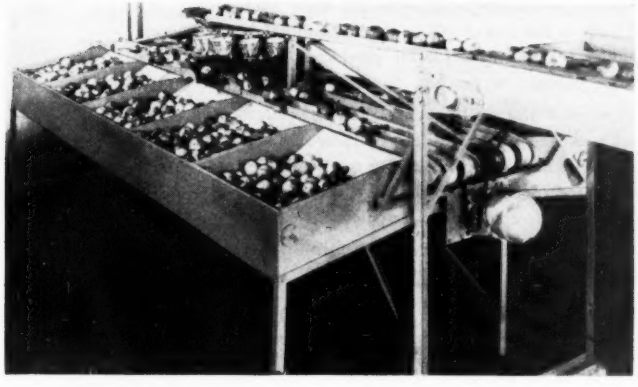
The extensions have been designed to remain on the elevating forks at all times, thus eliminating possibility of misplacement and providing assurance they're available as needed.

Constructed of formed steel channel sections with a retaining bar welded underneath (photo), they fit over the regular elevating forks. A locking pin welded to the extension drops into any of a series of holes drilled in the elevating fork, making it possible to extend the forks to several different lengths as may be required by specific jobs.

Extensions fit both the maker's 2,000 and 3,000-lb. capacity trucks.—*Raymond Corp., 6289 Madison St., Greene, N. Y.*

Circle 109A on Reader Service Card

Quickly, Accurately Sizes Fruits, Vegetables



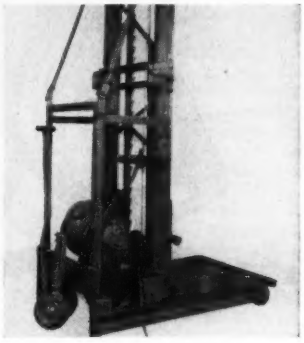
This new fruit and vegetable sizing machine is designed to give growers and packers rapid and accurate operation.

Called the Hartramph, the 12-ft.-long machine has ten spring-loader packing bins plus a sorting table. Accuracy is obtained through use of a calipering cup. The unit is termed capable of sizing 220 pieces of fruit per minute.

It may be adapted for double capacity on fruits and vegetables that require five sizes, such as tomatoes and apricots. Its greatest use is seen in sizing such fruits as apples, pears, and oranges.—*Harrah Sales Co., 2014 Sandy Blvd., Portland, Ore.*

Circle 109B on Reader Service Card

Air-Motor Hoist Runs Hazard-Area Lift



For use in hazardous locations, such as dusty and explosive-vapor areas, this new model portable elevator is designed for high safety. It is powered by an air-motor hoist operating from a compressor.

Hoist reportedly is economical in consumption of compressed air. Required pressure is stated to be 80 lb., with air consumption approximately 2.5 cfm. per ft. of lift. Recommended hose size is ¾ in.

New elevator includes: An automatic brake to hold the load; an automatic up-stop that shuts off air and thus stops motor just before platform reaches top position; a safety down-stop that does the same at platform low level; a graduated reversing valve that gives control of platform in any position; and a poppet throttle valve for preventing air leakage when hoist is idle.

Radial type motor makes for compactness. Its cylinders are renewable and interchangeable. Hoist has a large oil chamber for automatic lubrication of all movings parts.

Elevators are available with lifting capacities up to 2,000 lb.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Circle 109C on Reader Service Card

1. v.t. to
protect to keep safe or sanitary; 2. to beautify; enhance;
make outstanding; 3. to expedite handling, shipping; 4. to
merchandise; to promote.

there is no such word — but if there were

it would describe to a "T" the kind of packaging we produce.

Of the billions of containers we turn out every year, many are made at the rate of 400 or more a minute! Nevertheless, each container is tailor-made for the product it protects, whether that product be peaches, powders or paints.

It takes experience and skill to meet all the requirements of a "good package." We have devoted forty-five years to that job, yet each new product is a challenge to our research staff, engineers and technicians. And each new container we develop is a source of pride in achievement.

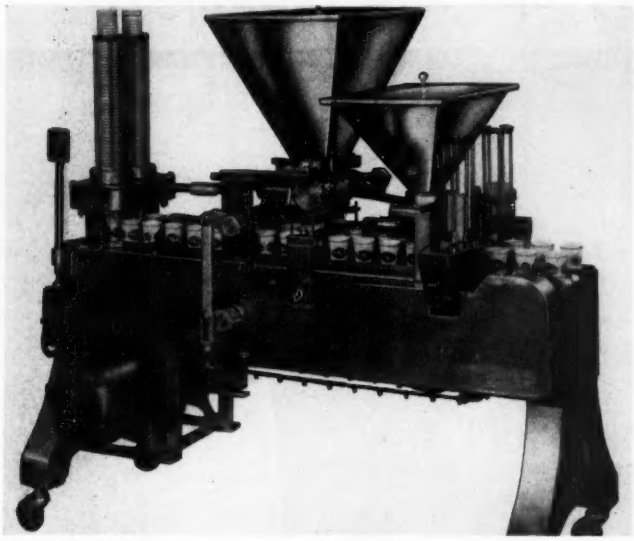
Our success is proved by the fact that so many makers of fine products — looking for fine packaging — look up Continental.

CONTINENTAL CAN COMPANY

CONTINENTAL CAN BUILDING • 100 East 42nd Street • New York 17, N. Y

Eastern Division: 100 East 42nd Street, New York 17 • Central Division: 135 So. La Salle Street, Chicago 3 • Pacific Division: Russ Building, San Francisco 4

Ice Cream Packer Fills 100 Containers Per Min.



This new ice cream packaging machine is reported capable of filling 500 doz. cups hourly.

Model M-100 filler is completely automatic, twin-line machine, built to fill 3-oz. cups up to ½ and 1-pt. cups, as well as sundae cups, dishes, and tarts. It is stated to operate up to 100 containers per minute.

Features of machine, states maker, include foolproof operation (no cup—no fill), accuracy of fill, bottom-up filling, and instant adjustment for all container sizes.

Sanitation features are stressed in both materials of construction and design—such as solid stainless steel or nickel alloy parts. Packer quickly disassembles for easy cleaning.—*Bagby Div., Triangle Package Machinery Co., 900 North Spaulding Ave., Chicago, Ill.*

Circle 111A on Reader Service Card

This New Respirator Hood Has Replaceable Window

Designed specifically for dust and paint spray protection, this "flyweight" respirator hood is now being made with a new replaceable plastic window. Hood's respirator has seven filters which are readily interchanged.

Formerly, the window was permanently sewed to hood, but now it's quickly detached with aid of seven snap fasteners. New plastic unit, says maker, provides vision that is unobstructed on the front and adequate on the sides.

Hood has two drawstrings that tie under arms, permitting a snug fit at all times. Also, there is leather reinforcement for long service. Moreover, hood has special elastic strap so that it fits any head.—*American Optical Co., Southbridge, Mass.*

Circle 111B on Reader Service Card

Plastic Flow Meter Needs No Packing

An acrylic plastic purge meter has been developed for elimination of packing glands and glass parts.

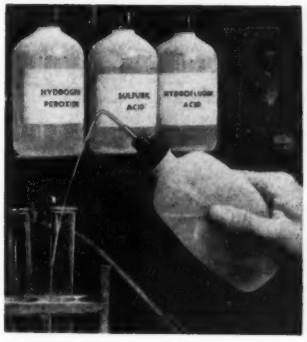
Meter comes in four sizes with a range of 0.01 to 54.0 gph. of water and 0.2 to 216 cfh. of air. Rate of flow is visibly indicated by position of a spherical float in metering tube. This tube and all piping connections are bored from a block of acrylic plastic.

Flow adjustment may be made with a needle control valve—an optional feature that may be installed on either the inlet or outlet position of metering tube.

Two standard models (photo) are currently available for metering flows where high accuracy is not required. Model R2000 has etched reference marks for approximate flow indication, while direct flow readings are made with the model S2000 meter, which has standard calibrations for either air or water. Both models are safe for pressures up to 100 psi. and maximum working temperature of from 180-200 deg. F.—*Brooks Rotameter Co., Lansdale, Pa.*

Circle 111C on Reader Service Card

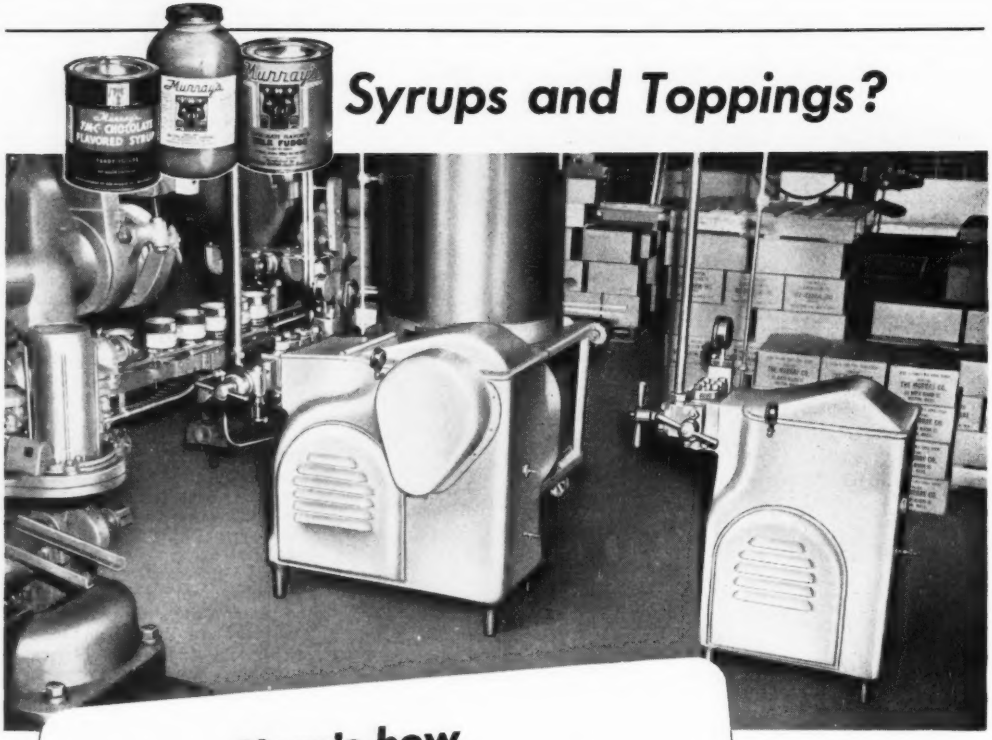
Unbreakable Wash Bottle Made of Inert Plastic



For use of laboratory research personnel, this Plaxpak wash bottle is designed to provide special convenience in controlled dispensing. It is an unbreakable, chemically inert plastic container.

With the dispensing assembly, the user simply squeezes the wash bottle to discharge contents—in a controlled stream, a quick spurt, or drop by drop. If thin stream is desired, the polyethylene spout can be stretched to de-

Syrups and Toppings?



Here's how GAULIN Homogenizers improve them

Murray Division of H. A. Johnson Co. installation, showing 500 and 200 GPH Gaulin Homogenizers used for Chocolate Syrup, Butterscotch Topping, and Milk Fudge.

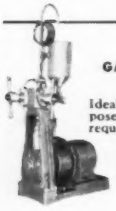
CHOCOLATE SYRUP — A Gaulin accents flavor. Makes a uniform, smoother texture. Prevents separation.

BUTTERSCOTCH TOPPING — Stops separation. Makes a finer, perfectly uniform dispersion.

MILK FUDGE — Improves flow and drape characteristics. Fudge holds folds . . . won't streak or bleed in fountain service.

And in each case, these emulsions and dispersions are made FASTER, MORE ECONOMICALLY . . . as well as uniform and stable . . . with a Gaulin Homogenizer.

Learn what a Gaulin Homogenizer can do for your product. Our complete testing facilities and experience in practically every industry are yours without charge or obligation. Write today.



GAULIN PILOT PLANT HOMOGENIZER

Ideal for experimental purposes, operation or process requiring up to 25 gallons per hour capacity. Handles quantities as small as one pint. Available on low rental basis.

GAULIN TWO-STAGE COLLOID MILL

Stator is jacketed for cooling or heating. Gap setting adjustable for .001" to .045". Only 45 seconds clean-up required in changing colors. 12" head room. 12" x 17" floor area.

Gaulin MADE MARK

Manton Gaulin
MANUFACTURING COMPANY, INC.
63 GARDEN STREET, EVERETT 49, MASS.

World's largest manufacturer of Homogenizers, Triplex Stainless-Steel High Pressure Pumps, and Colloid Mills

crease the size of the opening. For a heavier stream, the end of the spout can be snipped off to enlarge the vent.

If dropped, bottle will just bounce —no crash, splash, loss of contents, or cleaning up. It weighs one-fifth as much as a glass container of the same capacity. It is easy to handle and can be grasped securely even with moistened hands.

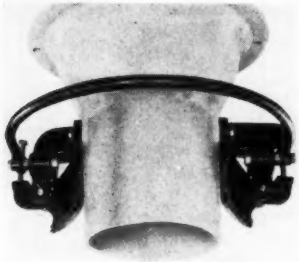
As for chemical inertness, there is no known solvent affecting bottle at room temperatures, and it is not attacked by strong acids or alkalis.

Chemical companies are using this container for hydrofluoric acid, mercury, hydrogen peroxide, and detergents.

The tubular polyethylene spout telescopes into a flexible plastic tube extending the full depth of the bottle. Spout can be replaced if damaged.—*S. H. Ansell & Sons, 817-825 Summer St., Boston 27.*

Circle 111D on Reader Service Card

Self-Lock Device Holds Bags Being Filled



Announced is a new self-locking bag holder for use when filling bags with bulk commodities.

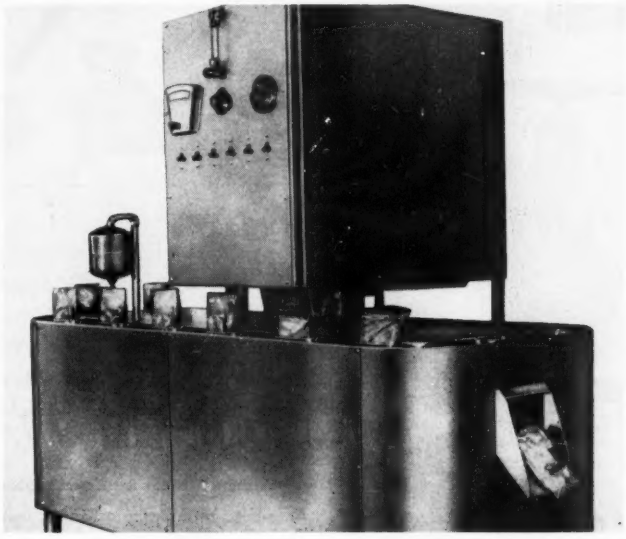
Self-locking device is especially designed to suspend 50, 80, and 100-lb. multi-wall paper bags. It comprises a cam-grip mechanism mounted on a spout which the user bolts to hopper or bin outlet. Empty bags are simply slipped over the mouth of the spout and up under the cams.

Positive grip holds bag in place during filling. To release a filled bag, semi-circular bar is pushed up, freeing the cams and allowing the bag to drop to a conveyor or skid.

Cast-iron spout has a flange top whereby it is bolted or welded to feed outlet.—*Richardson Scale Co., Clifton, N. J.*

Circle 113A on Reader Service Card

Speedily Packages Liquid-Solids in Film



Faster packaging of liquid-and-solid combinations in film bags is reported with use of this new machine called the "Wet-Pack."

Operators place film bags on the circular conveyor and fill them with the solids, such as sauerkraut, pickles, etc. Oils, brine, and other liquids are put in by the machine.

The solid product—pickles, for example—can be supplied to operators from a counter mounted above the conveyor. Then machine automatically dispenses brine to exact amount required and check-weighs the filled bag. Then bag is carried to air extraction and sealing sections. Sealed bag is discharged to a receptacle or to a conveyor for further processing.

Filled bags are automatically positioned before entering the sealer to assure mouth bonding.

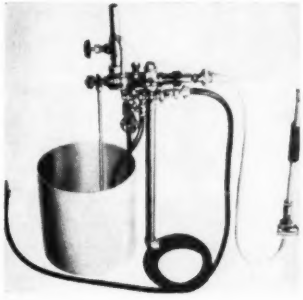
Brine tank holds 60 gal. and is arranged for quick refilling. Larger tanks can be used where desired. Automatic control float in tank permits use of overhead supply reservoirs.

Construction is all-steel with parts in contact with brine of stainless steel. Bearings are oil-free type from minimum maintenance. Conveyor is supplied in any length up to 15 ft.

Dimensions: Length 6 ft.; width 3 ft.; height 5 ft. 6 in.—*Edfin Packaging Machinery Corp., 2632 Grand Ave., New York City 68.*

Circle 113B on Reader Service Card

Single-Unit Cleaner Provides Double Action



Two-step cleaning—chemical and hydraulic—to remove smokehouse deposits, paint, and similarly stubborn matter, can be handled with this new single, compact unit designed for ease of operation.

Called the "Chemo Jet", it is designed to throw a solid stream of hot chemical, and it also provides a separate high-impact jet of water. For the chemical step, it supplies a 150 gph. jet of hot undiluted detergent or solvent, depositing a film on surfaces over 20 ft. away. This eliminates need for scaffolding and perforated

Walworth manufactures a *complete line* of Gate, Globe, Angle, Check, and Lubricated Plug Valves, made of Stainless Steel, Steel, Iron, Bronze, and Special Alloys in a wide range of sizes and temperature-pressure ratings.

Fittings of steel, iron, and bronze are also manufactured in all conventional types and sizes.

WALWORTH

valves and fittings

60 East 42nd Street, New York 17, N. Y.

Distributors in principal centers throughout the world

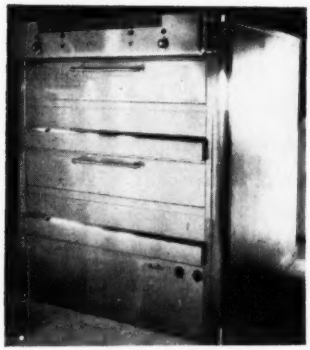
flow rigs. By another hose and nozzle the same unit shoots the jet of water, effective at distances up to 35 ft. Here, high temperature, pressure, and volume to 1,000 gph. combine to remove the chemical soaked material by a hydraulic scrubbing action.

All heating and propelling is done within the unit by ordinary plant steam, without heaters, pumps or any moving parts. Installation requires only connection to a plant steam and cold-water line.

Cleaners are available for wall-mounting, or may be operated as portable units with 50-gal. detergent tank. —*Sellers Injector Corp., 1629 Hamilton St., Philadelphia 30.*

Circle 113C on Reader Service Card

Variety Bake-Oven Has High Output



Capacity and flexibility are termed high in this new, compact 12-pan bake oven.

Independent gas-heated chambers, each thermostatically controlled, also independent steam injectors and ventilating ducts, permit simultaneous baking of various products under different temperature-and-moisture conditions.

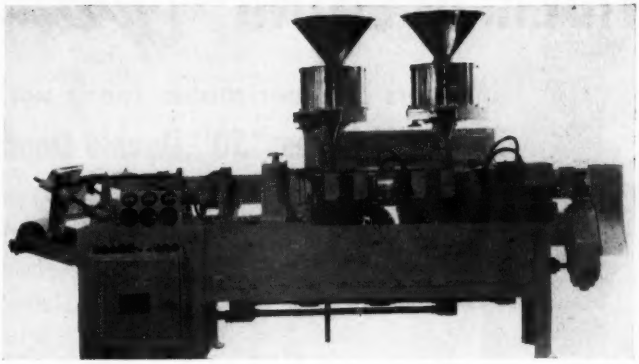
Maker states that only actual oven capacity required need be heated. Separate oven control permits continuous baking of different-temperature items.

Combustion efficiency combined with heavy insulation is stated to keep fuel cost low, while providing comfortable shop conditions. Compact design saves floor space. Also, there is fast loading and unloading, for chamber is only two pans deep and three across.

Ovens can be expanded by adding one or more sections as needed.— *Martin Oven Co., Rochester, N. Y.*

Circle 115A on Reader Service Card

Dual-System Steps Up Bagging Speed



High production records are claimed for this new model, automatic bag packager.

Although its basic design is standard, this unit is reported to make, fill, and seal packages from 2 x 2 in. to 3 x 3 in. at the augmented rate of 180 units per minute.

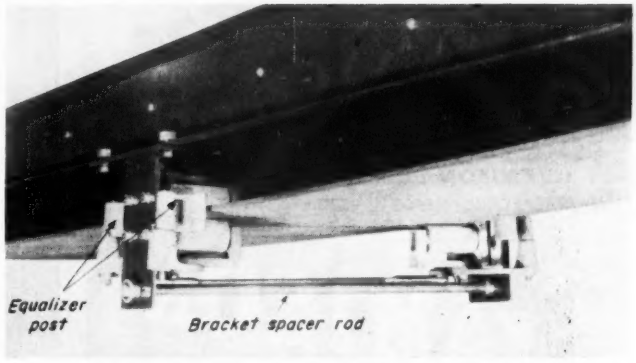
Speed is attained through use of twin hoppers and a double forming and filling system. In the operational sequence, large double-size bags first move in vertically and are formed. The bottom half is initially filled from the first hopper, then an iron effects a seal half-way up the bag. Next, the top half is filled from the second hopper and then a top seal is made.

At this time, cutting knives shear bags at the middle seal—and thus two completed packages are discharged. Unit speed is thus double the cycling speed.

Machine can also be converted to single filling when desired, providing packages from a minimum size of 2 x 2 in. to a maximum of 4¾ x 6¼ in. at reported speeds of up to 70 per minute. Machines are suitable for powdered and liquid products and a number of "hard goods" of small size. —*Bartelt Engineering Co., Rockford, Ill.*

Circle 115B on Reader Service Card

Device Keeps Belts Automatically Aligned

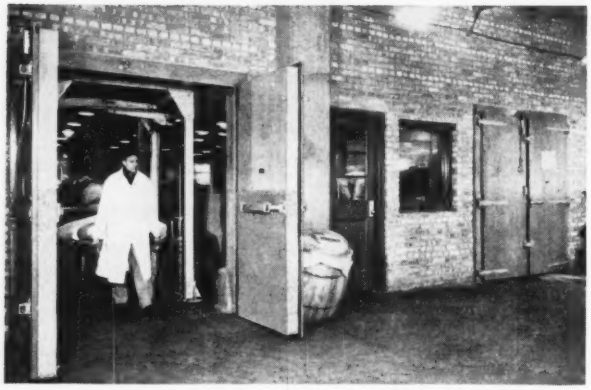


Wandering conveyor belts are kept aligned automatically by this positive-action Rapistan Belt Trainer. New device eliminates wear, down-time, and extra maintenance costs caused by the sidewise creeping of the belts.

Unit can be installed on any make of conveyor which has the return belt exposed beneath the bed. It is designed for use on fabric or rubber-

WIDER OPENING—*Speedier Handling*

of meats and perishable foods with JAMISON Series "50" Double Doors



● Today's *busy* tempo in the vast handling and storage of foods calls for speed and efficiency. There's no time to be lost, no labor to be lost. Jamison Double Doors fill the bill because they're twice as wide and can handle twice as much traffic in moving stock in and out of the refrigerated space.

These 3 views of Jamison Double Doors in use at Illinois Packing Company portray space and speed. Notice the inside metal kickplate—the handy bump-open bar. Here's *your door* for extra years of trouble-free, efficient operation. Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.

THERE'S A ***JAMISON*** *DOOR TO BEST FILL YOUR SPECIFIC NEEDS*

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

The leader for over 50 years

covered belts ⅝-in. or more thick, operating at speeds up to 200 fpm. Maker says there is no interference with normal conveyor operation.

Device is bolted to flanged rails on underside of conveyor. Flat sides of belt run between two sets of knurled spring-loaded rollers, with the belt edges contacting two sets of equalizer posts.

If belt begins to creep, its pressure against these posts cocks the knurled rollers to the new belt direction. This forces the belt back into alignment. Mechanism then returns to normal setting, again "ready."—*The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.*

Circle 115C on Reader Service Card

New Chemicals

Plastic Feeder Supplies Detergent to Washer

Made of durable plastic, this feeder supplies regular additions of detergent to the can washer's solution tank. Thus, desired solution strength for good washing is maintained.

Unit's action is hydraulic, controlled by the pre-rinse water feed line. Balanced amount of stock detergent solution is fed in as each can enters washer.—*The Diversey Corp., 1820 Roscoe St., Chicago 13.*

Circle 117A on Reader Service Card

New Acid-Type Detergent For Simpler Cleaning

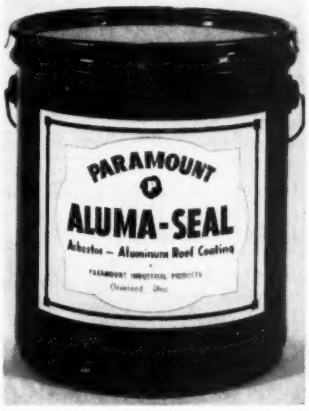
Use of an improved acid-type detergent is reported to simplify a number of cleaning chores in dairies, milk and ice cream plants, and cheese factories.

Cleaner is an inhibited acid providing a blended and balanced combination of inorganic salts and wetting agent. It is termed suited for daily circulation cleaning of such equipment as short-term pasteurizers or plate heaters, preheaters, hot milk lines and fittings, Vacreators, and vacuum pans.

Maker points to many advantages in can washing, including easier control of bacteria-harboring milkstone deposits, also curbing of scale formation and reduction of plugging in washed jets and screens. For convenient handling and storage, this powder cleanser is packed in 100-lb. plywood containers.—*Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14.*

Circle 117B on Reader Service Card

Asbestos-Aluminum Coat Cuts Under-Roof Heat



Announced is a new asbestos-aluminum coating that reputedly will lower under-roof temperatures from 10 to 20 deg. F.

Known as Aluma-Seal, new coating reflects sun rays instead of absorbing them as do black coatings. Maker states that this feature of reflection also retards drying of waterproofing oils, thus prolonging roof life.

Coating is made of asphalt, asbestos, and waterproofing oils doubly pigmented with aluminum. It is said to withstand extremes of heat and cold without cracking or wrinkling, and is termed highly resistant to industrial vapors, gases, and fumes. It can be applied by either brushing or spraying.—*Paramount Industrial Products Co., University Center Station, Cleveland 6.*

Circle 117C on Reader Service Card

Plastic Floor Patch Goes In Easy

Simplicity of application and high strength are reported for a new fast-setting floor patch material.

Known as Redi-Patch, the new plastic filler can be applied to damp or dry concrete, asphalt, brick or mastic floor by a single handyman.

To use, hole is simply swept clean, then plastic is put in and tamped level. No plasticizer is required. Maker states that within a short time after tamping, truckloads may be driven over patched areas without fear of damage to patch.

New filler contains both metallics and pure rubber latex, has no stone or similar aggregates.—*Dasco Co., Inc., 1602 Thames St., Baltimore 31, Md.*

Circle 117D on Reader Service Card

Aluminum Paste Offered For Bright-Metal Jobs

Greater brightness is stated to be given to polychrome or metallic finishes by a new aluminum-type cleaner.

Designated as Aluminum Tinting Paste No. 222, product is described as imparting "flash" to a greater depth of the finish.

The pigment is characterized by an absence of seeding. Metal content of paste is 65 percent.—*Aluminum Co. of America, Pittsburgh, 19.*

Circle 117E on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

In Behalf of Progress . . .

Against "Chemicals" or Against Progress?

At long last, the historical decision required to establish the final bread standards has been made by the Food & Drug Administration. The decision is that chemical "softeners" cannot be used in the five principal standardized breads.

We refer to the polyoxyethylenes, which have been the center of the hottest controversy the food industry has seen in years. Mono- and diglyceride softeners, from "natural" sources, are permitted.

This decision is history-making because it involves so many questions of fundamental importance to our industry.

First, it effectively demonstrates—at a time when modification of the Food, Drug & Cosmetic Act is under consideration—the full impact of placing the burden of proof as to safety on the ingredient user or manufacturer. F&DA doesn't say that the polyoxyethylenes are harmful to health. It doesn't need to. It is enough to contend that they have not been tested adequately for safety as ingredients in bread. And that's that—although a prominent and reputable chemical processor sponsored extensive independent toxicological tests which proved to its complete satisfaction the harmlessness of the emulsifiers.

What makes the not-safe decision particularly flimsy is the fact that the chemical softeners are permitted in special breads if mentioned on the label. Since when does declaration remove harmfulness?

Second, F&DA gives this as an added reason for barring the polyoxyethylenes: They have the effect of making bread appear fresh for days after baking.

Now, is that really bad? And what about the approved mold inhibitors? Longer shelf-life of food products has long been a major goal of the industry. Not only does extended life of perishables avoid waste through spoilage, but it is a quality service to the consumer. What's more, it has great cost-saving advantages—which reflect in prices. Frequency of delivery is reduced. And more centralized production in larger and more efficient plants is permitted.

Third, the F&DA decision favors "softeners" developed from natural fats and oils, thereby expressing favor for the status quo and intimating that natural products are better and safer than ingredients developed through research in industry. The unfortunate part about this is that it destroys the incentive for research into food improvers. Yet great benefit could come from the tremendous research budget, the processing facilities, and the technical knowhow of the chemical manufacturers.

Fourth, there is little question that pressure reared its ugly head in the bread standards proceedings. How much effect this had cannot be measured. One can only wonder.

Fifth, the decision demonstrated a serious need for a set of "ground rules" on what constitutes adequate proof of safety for a new ingredient. Without such rules, how can any ingredient manufacturer or user proceed to prove a point conclusively to F&DA?

Sixth, the bread standards decision exemplifies the effect of legislated bureaucratic power.

Seventh, the long-drawn-out, sometimes bitter, bread hearing clearly proves that a more efficient standards-establishing procedure is needed.

Despite these points, we believe that F&DA is fairly and squarely discharging its public duty under the law. It simply is playing it safe—as would you or I. On the whole, the bread standards are to the good of the industry and the consumer.

Yet one can't help but feel that technologic progress has taken a blow. That research has been impeded and help from the chemical industry in improving foods has been discouraged.

If further tests develop a definite conclusion as to the safety of the chemical "softeners," the hearings will reopen, F&DA assures industry. That sounds good. It seems to offer hope. Only who is to know what constitutes definite proof?

Looks like the "polys" have been hung by a thread —unless they get a break in court.

Food-Law Action Needed

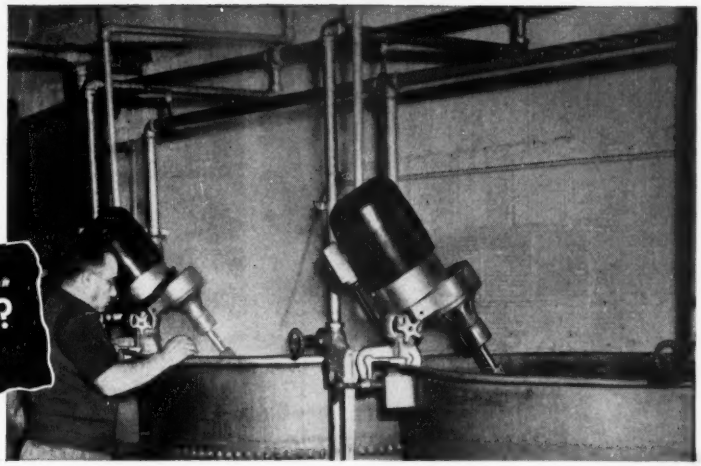
Some authority-wielding group in the food industry should come up with proposals regarding amendment of the Food, Drug & Cosmetic Act. Chemical Manufacturers Association has long since announced its recommendations. F&DA has sponsored the Miller Bill. But those most vitally concerned—the food processors—have made no recommendations as a body.

The soundest new food legislation will come from a joint proposal by the food and chemical industries. If there is no basis of agreement between the two, Congress is likely to take the word of F&DA or of some crusading Congressman.

The Institute of Food Technologists is the group best qualified for this job. It should develop recommendations, then sit down with MCA.

The latter is eager to reach an agreement with our industry on proposed legislation which will protect consumers—yet not unduly tie the hands of industry nor grant dangerous bureaucratic powers to government.

LIGHTNIN Mixers mounted on open kettles for cooking and processing cranberries.



Mixing fluids?

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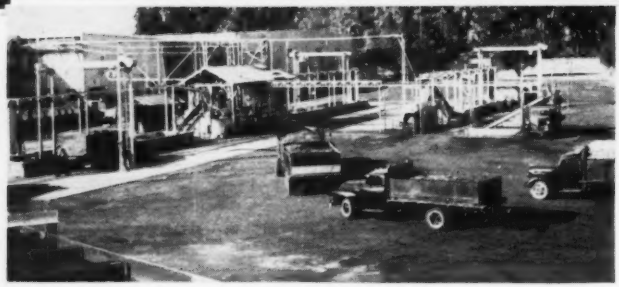
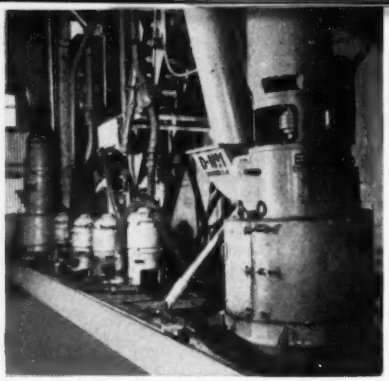
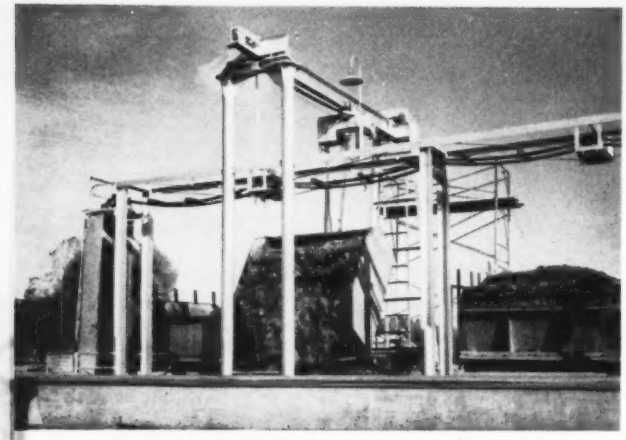
TURN PAGE FOR FOLDOUT FLOWSHEET →

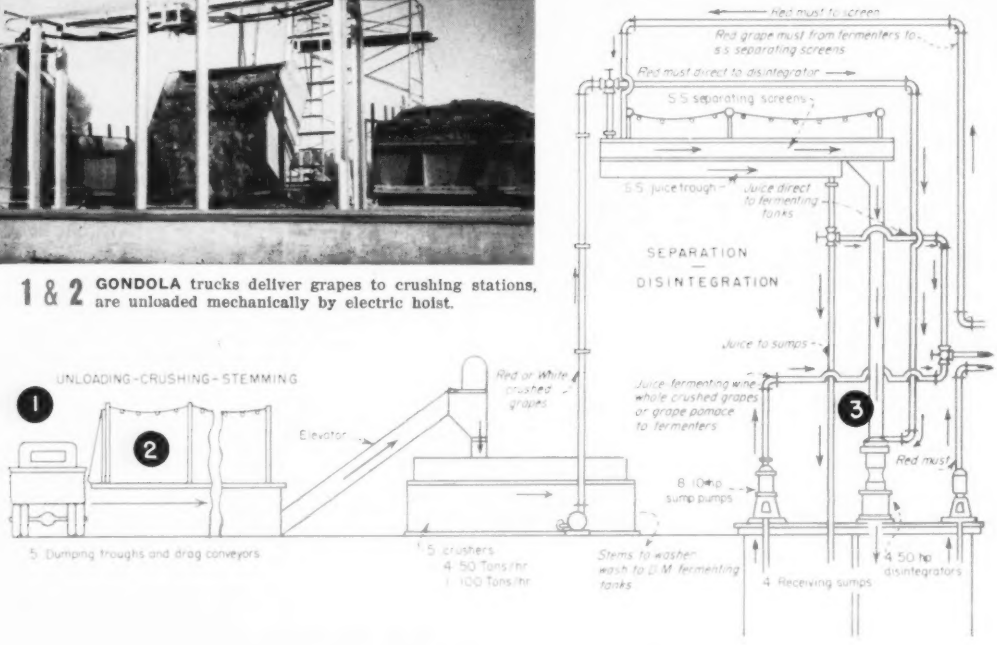




3 **CRUSHED** port wine grapes are disintegrated in these units (foreground and rear).



1 & 2 **GONDOLA** trucks deliver grapes to crushing stations, are unloaded mechanically by electric hoist.


Red must to screen
Red grape must from fermenters to s.s. separating screens
Red must direct to disintegrator
5 S.S. separating screens
5 S.S. juice troughs
Juice direct to fermenting tanks
SEPARATION
DISINTEGRATION
Juice to sumps
Juice, fermenting wine, whole crushed grapes or grape pomace to fermenters
Red must
8 10-H.P. sump pumps
UNLOADING-CRUSHING-STEMMING
Elevator
Red or White crushed grapes
5 Dumping troughs and drag conveyors
1 S. crushers
4 50 Tons/hr
1 100 Tons/hr
Stems to washer; wash to D.M. fermenting tanks
4 Receiving sumps
4 50 hp disintegrators

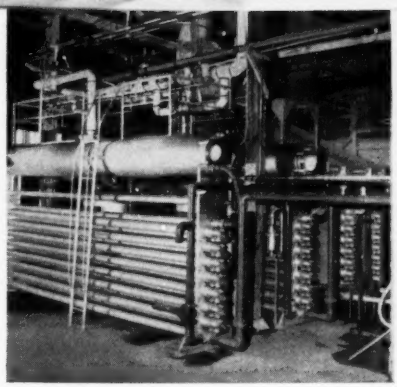
How Dessert Wines Are Made Today

Use of Modern Equipment and Methods Raises Quality and Production

ADVANCED practice in dessert wine making, incorporating recent engineering progress, is graphically portrayed in the accompanying flowsheet. Depicted are the operations at Italian Swiss Colony Winery, Clovis, Calif. Both red and white wines are made by the company. This text covers the former.

Grapes from the vineyards are delivered to the winery in gondola trucks. Then after being dumped mechanically by means by an electric hoist—Point (2) in the diagram—they are transferred via conveyor through to the crushing station, where capacity is 300 tons/hr. Red must (crushed grapes and juice) is pumped direct to the disintegrators, then goes through the continuous color-

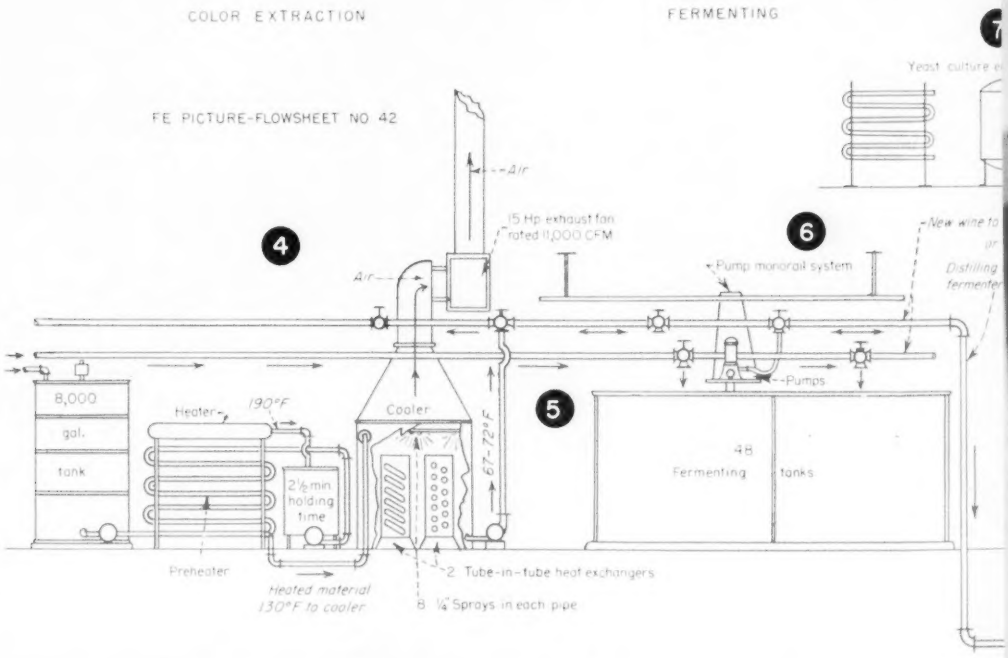
WHAT'S BEHIND today's new winemaking efficiencies, also future strides the advances now presage, are detailed in this month's FE Report—Dessert Wine Progress (pages 95–100)



4 **COLOR** is extracted from must by this equipment. Process is continuous.

5 **FERMENTING TANKS.** Pomace cap is visible on juice in foreground. Next tank contains clear juice.

6 St in



extraction processing units–Point (4). Colored must is pumped back to stainless steel separating screens–above disintegrators, Point (3). Pomace is now dropped to a sump, mixed with water, later pumped to distilling material tanks. Strained juice goes to fermenting tanks–Point (5). Pumps, suspended from monorail above these tanks, move the DM to continuous stills–Point (8)–where it is converted into brandy used to fortify wine. Fortified wine goes to aging cellar. Yeast culture units are seen above fortifying tanks.

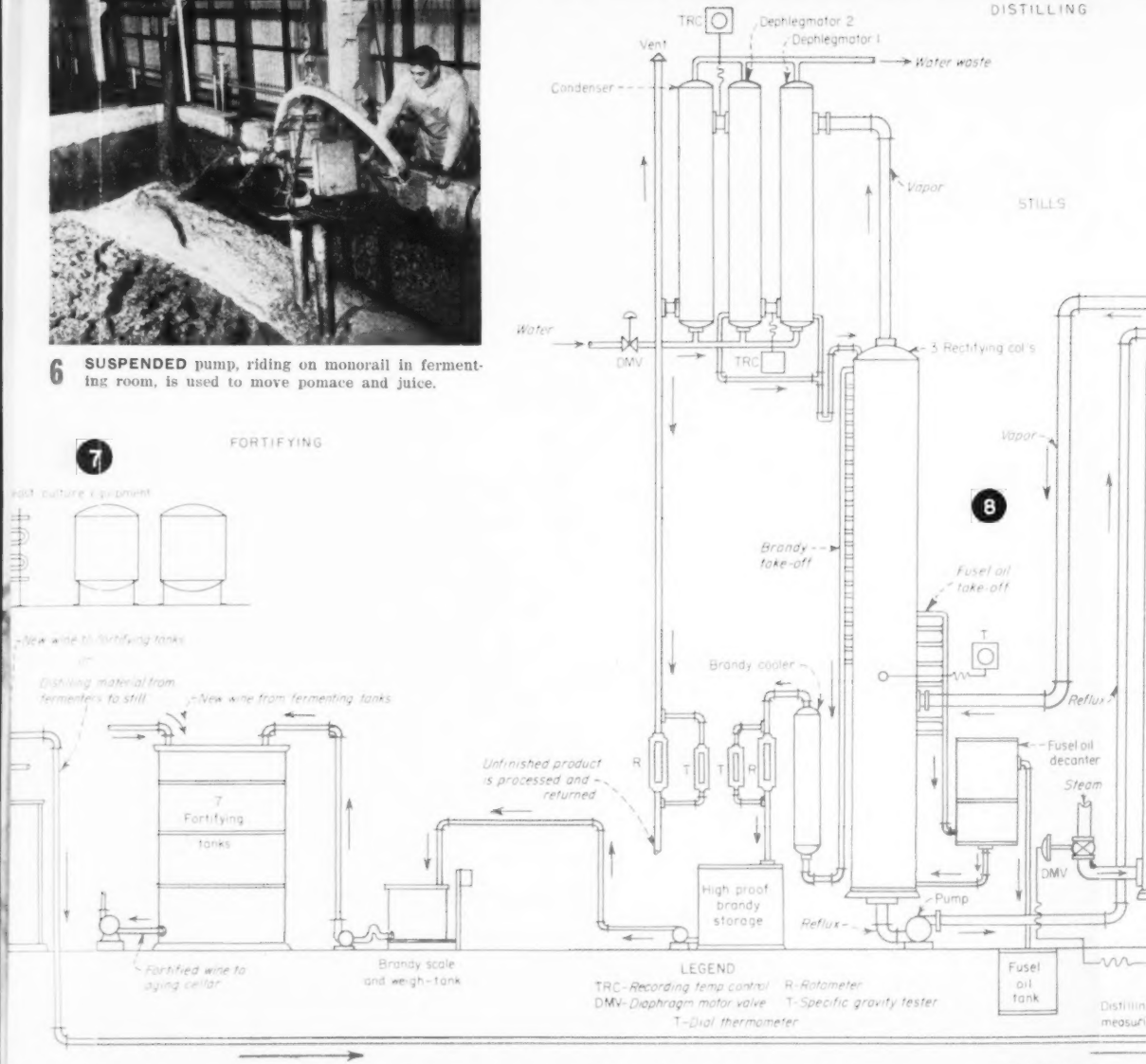
Stillage at this plant is piped from the distillery to shaker screens–Point (9)–where the greatest part of the suspended solids are removed. Solids go to an expeller-type screw press, where cake is turned out for cattle feed and press liquid is returned to screened liquor.

This liquor is treated with lime as it goes to a flocculating basin. Treated liquor flows to sedimentation basins. Solids are moved, via drag conveyor, to a sump, then pumped for air drying. Liquid is pumped to disposal basins.

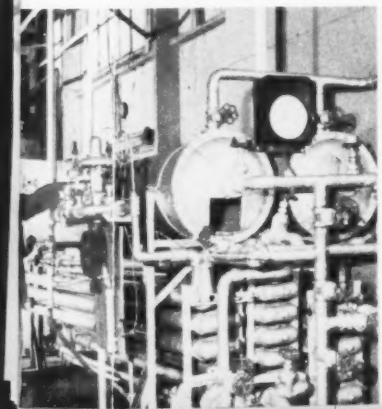
There are no complete and exact material balance data from which to develop a sound formula for the conversion of grapes to wines. Hence, the material-balance presentation given here is theoretical, although it is based on those figures known. This process design represents today's leading practices.

7 **HERE,** pure yeast is produc (foreground) and propagatio

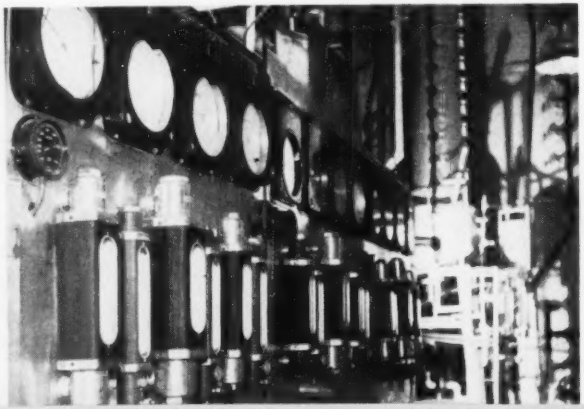
6 **SUSPENDED** pump, riding on monorail in fermenting room, is used to move pomace and juice.



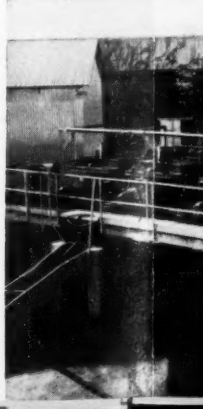
st is produced. Seen are pasteurizing unit propagation tanks (rear).

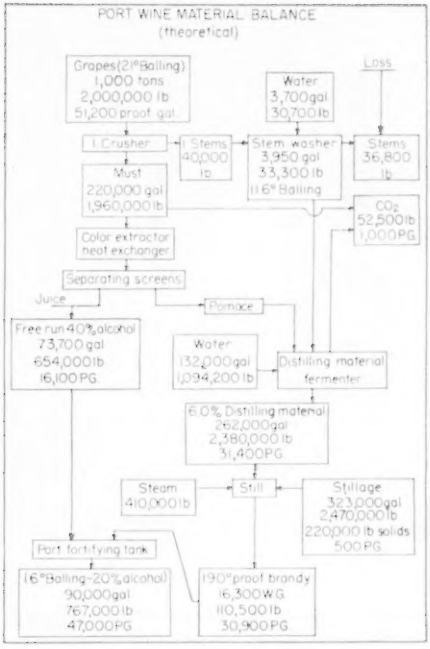


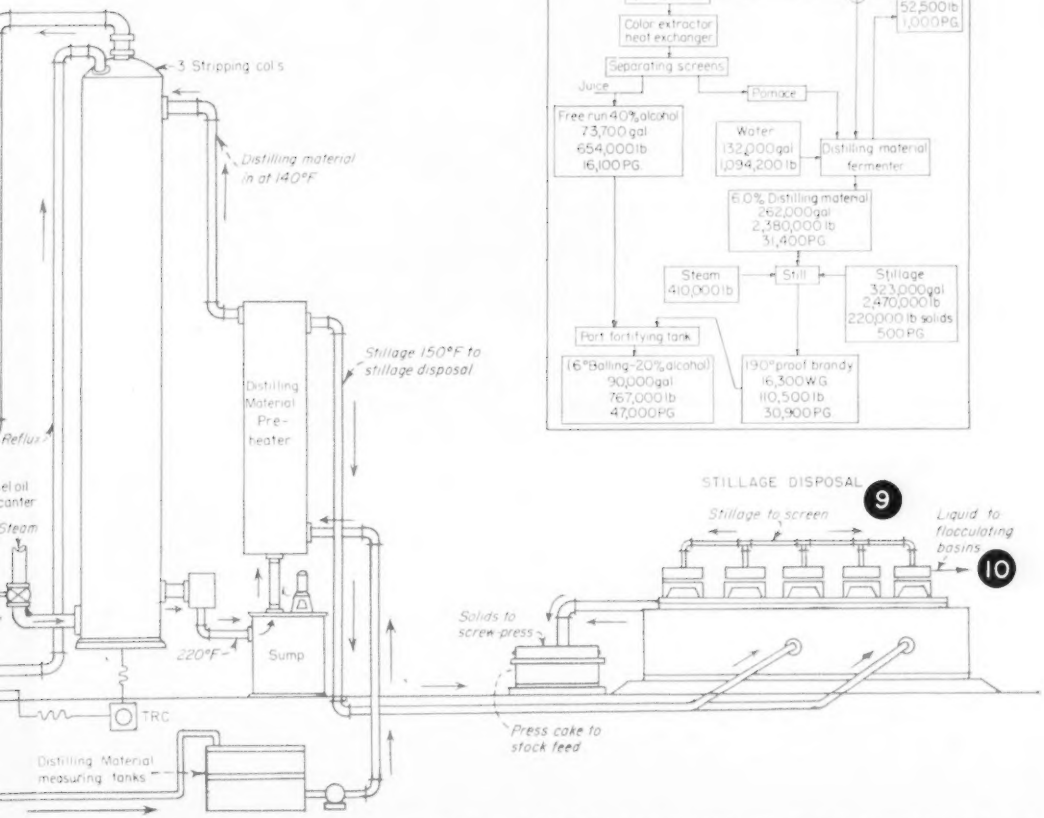
8 **THESE INSTRUMENTS** control four-still unit. At top are temperature and pressure recorders. Below them are rotameters.



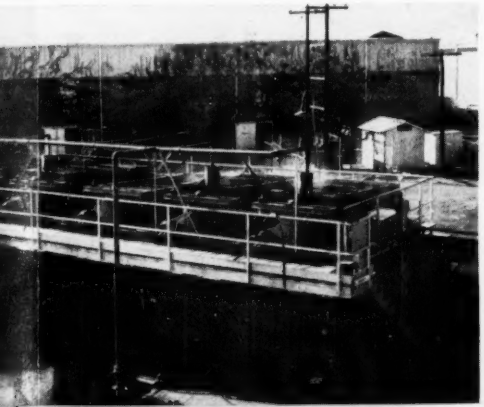
9 **STILLAGE** goes to sl solids. Liquid is troug



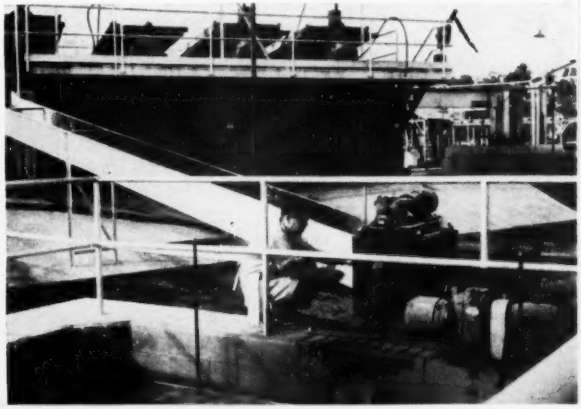




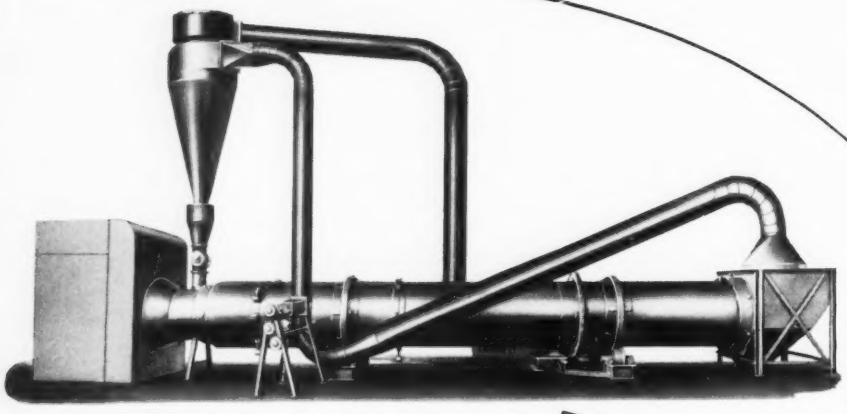
goes to shaker-screens atop collection tank for removal of uid is troughed-out at left, solids discharge at right.



10 FLOW of lime-treated stillage into flocculation basins is measured by this V-type weir. Motor (right) drives agitator.



"...first look at the STANDARD-HERSEY DRYER"



Modern STANDARD HERSEY Starch Dryer

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STANDARD-HERSEY DRYER doubles drying production for Potato Starch Manufacturer

"Standard Steel Corporation,
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Gentlemen:

We were one of the first Potato Starch Manufacturers in Maine to convert from the old type dry house method of drying, to the use of the Hersey Steel Dryer.

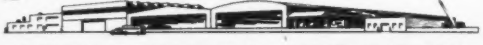
Our drying production doubled when we installed the Standard-Hersey Starch Dryer, our labor cost went down, and the quality of our starch was greatly improved.

We can strongly recommend to any interested party planning a change in their starch drying method, to first look at the Standard-Hersey Dryer.

Yours very truly,
PRESQUE ISLE STARCH COMPANY
(Signed) G. F. Washburn, Jr."

STANDARD HERSEY Dryers

SEND FOR new, illustrated STANDARD-HERSEY Dryer Bulletin No. 508. Describes the more than 30 types of dryers available in all commercial sizes for every process industry need.



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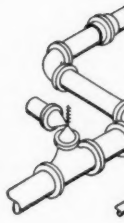

On steam suppl
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Specifications fo
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pressure to coo
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range was selec
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For 16 years,
Pressure Regula
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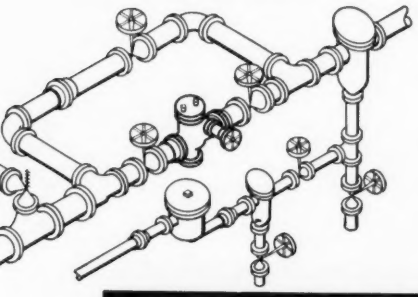
FOOD ENGIN

Can Your Pressure Regulators Match This Service Record?

on a Steam Kettle for instance



THE INSTALLATION

eam supply line to cooking kettle, Schoenling ng Company, Cincinnati.

THE HISTORY

cations for this installation called for a regu- to reduce main line steam supply at 100 psi psi, and automatically maintain the reduced re to cooker, 24 hours daily, without signifi- uctuation.

rane Pressure Regulator with factory pre-set was selected and properly installed with ade- automatic drainage of the steam lines.

16 years, throughout its lifetime, the Crane re Regulator did its job to the brewery's com- atisfaction. Never was it out of service; never require more than the simple prescribed peri- nspection. (Note: current model has renewable ng parts; will virtually never wear out.)

VALVE SERVICE RATINGS

SERVICE LIFE:	16 years - 24 hours per day
MAINTENANCE COST:	None - simple servicing only
SPECIAL FEATURES:	Good pressure range - easy adjustment
SUITABILITY:	Steady flow - no pressure build-up
OPERATING RESULTS:	Accurate control of cooking process
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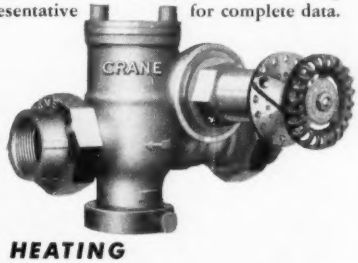
THE VALVE

Crane No. 960 Brass Pressure Regulators are made for reducing steam or air pressures up to 250 pounds, to within 80% of inlet pressure. They are factory pre-set to operate within any of 4 ranges from 1 to 200 pounds, with easily selected outlet pressure within set range. Precision made, they are fully automatic, highly dependable, even under reasonable fluctuation of inlet pressure. All wearing parts renewable. See your Crane Catalog or Crane Representative for complete data.



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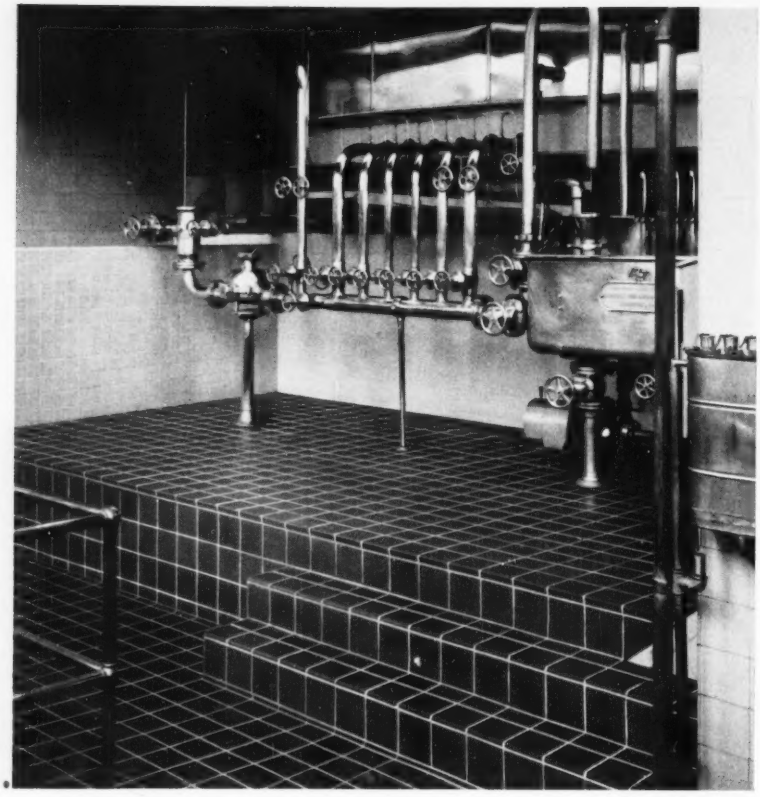

Fehr's new Brewhouse, Louisville, Ky. 4¼" x 4¼" Wall Tile, Color No. L-216. Floor—6" x 6" Carlyle Quarry Tile in Navajo Red.

walls and floors of Mosaic Tile!

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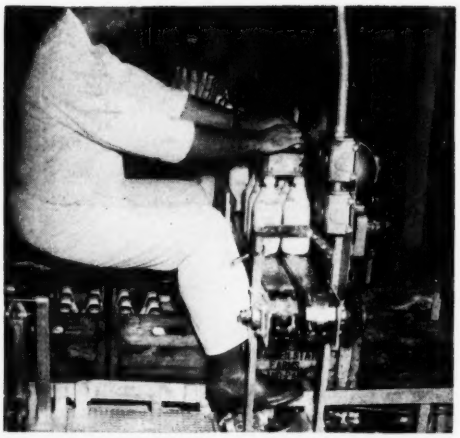
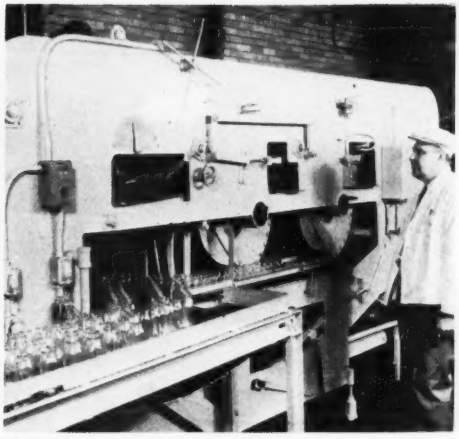


FILLED BOTTLES are speedily packed in this New Jersey dairy by new semi-automatic caser. Comfortably seated, operator accelerates the operation by controlling movement of cases with pedal under his right foot.



THIS UNIT automatically uncases bottles and distributes them evenly on soaker feed table in Chicago Borden plant. Note large transfer wheels that lower bottles from top of unit and deposit them on discharge conveyors.

These Bottle Handlers Cut Labor, Breakage

New uncaser "robots" bottles out of full-height cases, speeds them to washer . . . And with special casing system, filled bottles are handled "by the bunch" for quick packing

FE STAFF

Notable savings in labor and reductions in bottle breakage are among the benefits achieved by two new bottle handling units now available to dairy plant operators.

The new machines are:

• An automatic uncaser and washer-loader capable of feeding up to 576 bottles per minute, and

• A semi-automatic casing system by which one operator can case from 120 to 140 bottles per minute.

Details on this advanced equipment will be given in turn:

Uncaser, Washer Loader—This unit (right photo above) can be made to handle wooden, metal, or cardboard cases or cartons, and a wide range of types and sizes of bottles.

Cases are fed from the plant conveyor system directly into the lower portion of the uncaser. They are then carried upward and inverted.

As the cases continue through the machine they reach a point where first the inner rows of bottles, then the outer rows, are gently lowered into large revolving transfer wheels with pliable rubber gripping surfaces.

These wheels hold the bottles firmly as they revolve and then deposit them on conveyor belts that supply the washer feed (as seen in photo).

Meanwhile, the cases are set right-side-up and delivered to the discharge conveyor, which may either be on one side or to the rear of the machine.

The uncaser will automatically stop and ring a signal bell if faulty cases or improperly positioned bottles are fed in, or if cases or bottles are not properly removed after being discharged.

Plant labor saving with this new equipment is illustrated by the fact that where formerly two men were required to feed the soaker at The Borden Co.'s Hamilton Park plant in Chicago, one man now merely devotes part time to servicing the new uncaser.

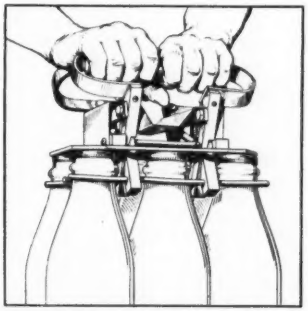
Other benefits derived from the machine's use in this plant: There has been a marked reduction in breakage of bottles, decided improvement in sanitation and housekeeping, less manual handling of cases and bottles, and better inspection of bottles before entering the soaker-washer.

Maker of this equipment is the Radio Corp. of America, Camden, N. J.

New Casing System—This is comprised of specially engineered bottle and case conveyors and a 6-bottle gripper (left photo above). With it, one operator can case from 120 to 140 bottles per minute.

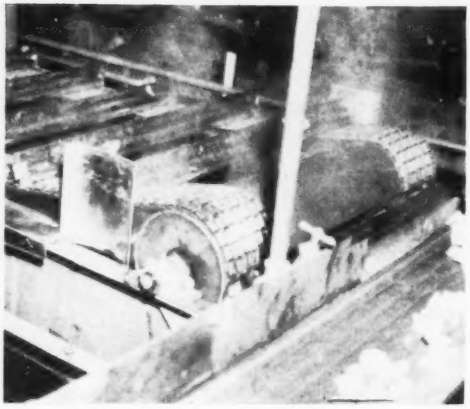
In operation, a single line of bottles, moving on a conveyor from the filler, feeds into a non-jamming divider that alternately delivers bottles to two paral-

(*Turn to page 170*)



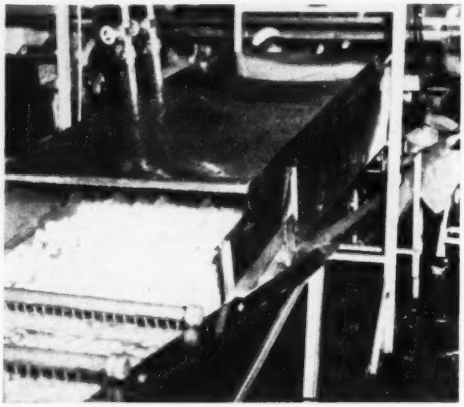
KEY UNIT of the Mapes System is this 2-hand gripper that enables the operator to pick up 6 bottles.

Advanced Blanching



HOT-WATER BLANCHER feed is shown as apple slices enter via belt conveyor. Unit is stainless throughout.

Careful Conditioning



AFTER blanching, slices get tap-water bath (left foreground), then go through refrigerated spray tunnel (center).

Small Plant *Teams Technics* to Clinch

FROZEN-FRUIT QUALITY

By applying "know-why" as well as "know-how," it has engineered high performance blanching, freezing, handling, and processing into an A-1 four-product operation

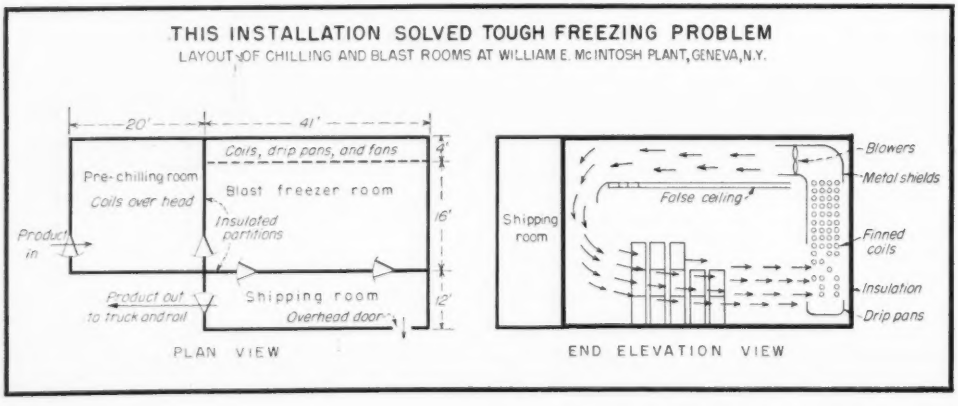
WALTER H. HARTE
Assistant Editor, "Food Engineering"

Efficiency and resourcefulness are aptly combined to turn out quality frozen fruits at the small, but compact William E. McIntosh Co. plant in Geneva, N. Y.

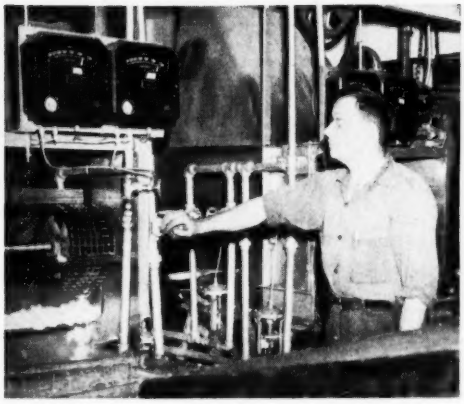
Here, the job of fruit handling has been carefully streamlined through application of versatile equipment, much of it designed by the company itself. Further, each step in the processing is marked by astute planning that enables successful competition with the larger operations in the field.

Going far in achieving its high performance system is the company's constant practical curiosity in seeking out the "whys" as well as the "hows."

Specifically, the home-designed blanchers for the apple slices and the efficient two-step blast freezer call for the spotlight, also the flexible operational layout and the quality control measures. Each of these will be discussed in turn:

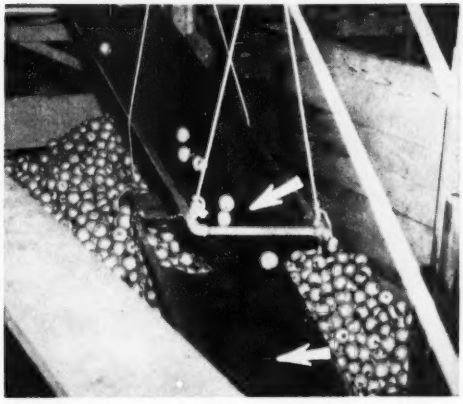


Exacting Control



SPARGER steam to blanchers may be controlled to compensate for fruit types and maturity and slice size.

Safeguarded Product



THESE canvas chutes, cushioned with running water (arrows), exemplify gentle handling technic for fruit.

Three stainless steel, hot-water blanchers have been installed at McIntosh to heat sliced apples prior to freezing—with direct steam spargers providing heat. Each of the blanchers is equipped with two pneumatic temperature controllers and a variable speed drive. The controllers—one regulating the temperature at the inlet and the other at the outlet—operate by throttling of a valve in the steam-sparger line.

The blancher feed-end is usually kept at 204-208 deg. F., with the discharge end at 210-212 deg. F. The exact temperature depends upon the maturity, size, and variety of apples. The latter factors also determine the speed setting of the variable speed motor driving the blancher paddles that move the apple slices through the unit. Blanching time usually is between 1½ and 2 min.

(*Turn to page 204*)

Thumbnail Resume of Operations

Frozen-fruit packing usually starts in June on strawberries, follows on sour cherries and peaches, and ends in February with apples. The peak employment figure is about 100. Here is a summary of daily plant-production capacity in season on the fruits, varieties used, handling, and procedures:

STRAWBERRIES: 15,000 lb. frozen per 8-hr. day.

***Raw material*—Premier and Sparkle varieties, received in quart baskets.**

***Processing*—Berries are hulled, washed, chilled, and canned with 1 part sugar to 4 parts fruit prior to freezing in 30-lb. tins.**

SOUR CHERRIES: 45,000 lb. frozen per 16-hr. day.

***Raw Material*—Montmorency variety, delivered to plant in 40-lb. lug boxes.**

***Processing*—Fruit is soaked in 50 deg. F. water for 3 hr., chilled, washed, then inspected. Finally, fruit is depitted and canned—1 part sugar to 5 parts fruit.**

PEACHES: 15,000 lb. frozen per 8-hr. day.

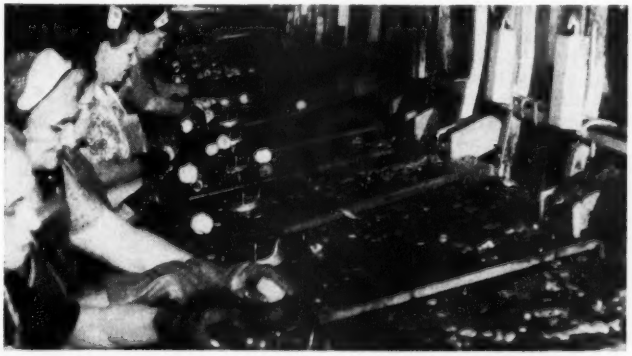
***Raw material*—Hale Havens and Elbertas, received in ½ bu. baskets.**

***Processing*—Fruit is halved, pitted, and passed through a steam bath to loosen skins. After cooling under water sprays, skins are removed by hand and fruit inspected. Fruit is canned in proportion of 4 parts to 1 part of sugar before freezing.**

APPLES: 45,000 lb. frozen per 8-hr. day.

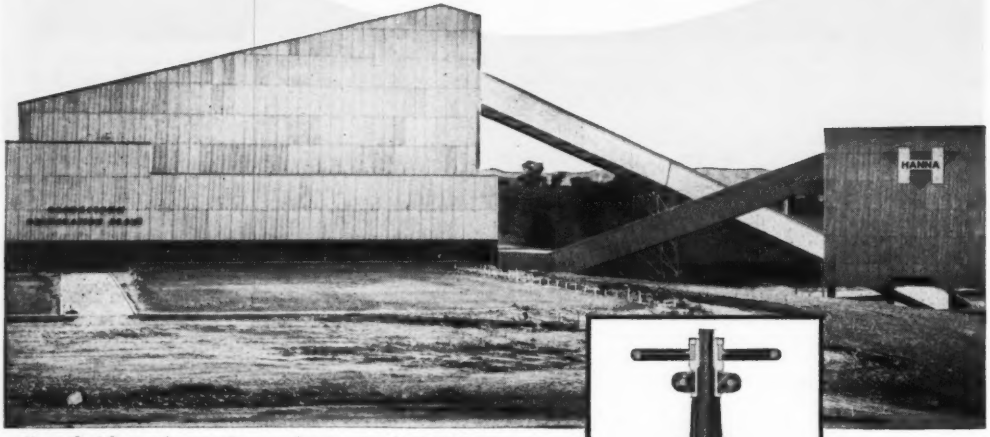
***Raw material*—Rhode Island Greenings, Baldwins, and Northern Spies, delivered in crates or bushel baskets. Some are processed immediately, while others are held in cold storage.**

***Processing*—Fruit is first sized and washed, then peeled, cored, and sliced (photo below) before blanching. After blanching, cooling, and inspection, slices are packed in cans—7 parts of fruit to 1 part of sugar.**

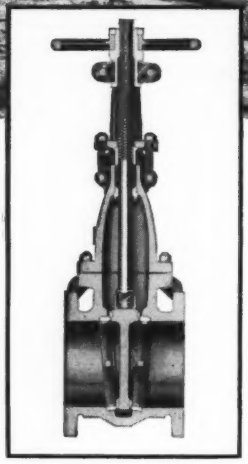


BANK of triple F. B. Pease automatic apple peelers, corers, and slicers handles fruit only after it has undergone rigorous inspection.

Hanna Coal Company Preparation Plant . . . served by the OIC LONG LINE of valves



Hanna Coal Company's mammoth new coal preparation plant in service now at Georgetown, Ohio.



"We've standardized on OIC Valves; all kinds for all kinds of service. They're the best!"

Hundreds of OIC Valves—iron, bronze and steel—were used in this coal preparation plant, completed just a year ago. OIC Valves were selected by Hanna Coal Company after many years' experience with these valves at their other properties—evidence of the fine performance they provide.

Simplify your procurement problems by calling the nearby OIC distributor. The OIC Long Line offers the right valve for every job.

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FOUNDED 1883

VALVES
FORGED AND CAST STEEL · IRON · BRONZE

CONVENIENCE items such as these pastry "shells," instant bouillon, and dehydrated meat bases, prove popular.

Builds Substantial Business in

NOVEL FOODS

Fried-noodle "nests," concentrated consomme, and dried beef and chicken bases are profitably made for institutional and consumer trade by Chicago processor. Here's how

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

The manufacture of specialty foods –particularly those designed for the convenience of users–doesn't have to be confined to the retail consumer trade. It has a lot of potential in the institutional field, too.

Swiss Products, Chicago, foresaw–and has now built–a big market in both fields for such specialty items as fried-noodle "bird's nests," concentrated consomme, and dehydrated beef and chicken bases.

In demand as substitutes for pastry shells, these "nest" items are used more and more for such creamed dishes as ham, chicken, turkey, and tuna. They consist of very thin, high-egg content noodles that are molded into the shape of a nest and then deep-fat fried.

Concentrated consomme and dehydrated beef and chicken bases are now being produced by Swiss Products to meet the mounting consumer and institutional preference for easy-to-prepare items to be used in making soups and gravies.

Making Fried Nests

Production of fried noodle nests is a five-step operation:

1. Moist noodles, purchased according to specifications, are hand-formed to the desired shape with the use of patented, stainless steel wire-mesh molds. Packing the 3-oz. portions of noodles into the curled brim portion of the sombrero-shaped mold is facilitated with the use of a Lucite cylinder, which is placed over the mold to form retaining walls. Each mold is then topped with a wire-mesh cap to prevent the noodles from floating in the deep-fat fryer.

2. Four-dozen filled noodle molds are next loaded onto an expanded-metal tray, which is submerged 2 min. in a batch-type, deep-fat fryer. Temperature of the cooking fat is 330 deg. F.

3. The trayload of molds is then removed from the fryer and placed on an inclined, stainless steel draining table attached to the fryer. Draining of excess fat takes about 2 min.

4. Still in molds, fried noodles are now placed on a stainless table and cooled by two fans suspended directly above it.

5. After cooling, the noodle nests are removed from the molds and stacked on a double-decker rack holding 135 dozen nests. Lots comprising four nests are then packed into a double window carton for the consumer trade. For the institutional trade, the nests are packed 2 dozen to a carton.

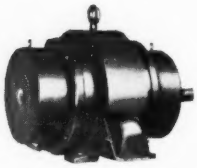
GUARD YOUR PRODUCTION AGAINST the Hazard of SPLASHING LIQUIDS

WITH

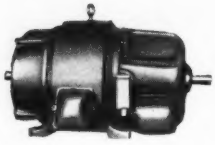
Century SPLASH PROOF MOTORS

Century 7½ HP Type RS Single Phase Repulsion Start Induction Brush Lifting Splash Proof Motor.

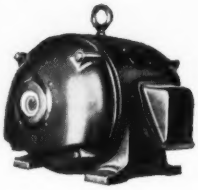
1 to 7½ HP Direct Current Splash Proof Motor.



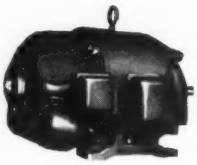
150 to 400 HP Type SC Squirrel Cage Induction 3 Phase Splash Proof Motors.



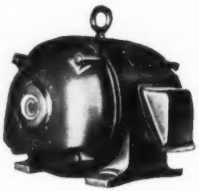
30 to 100 HP Type SR Slip Ring Induction 3 Phase Splash Proof Motors.



1 to 125 HP Type SC Squirrel Cage Induction 3 Phase Splash Proof Motors.



3 to 25 HP Type SR Slip Ring Induction 3 Phase Splash Proof Motors.



1 to 20 HP Type CS Capacitor Start Induction Single Phase Splash Proof Motor.

Keep the vital parts of your motors dry —even when the full force of a hose is turned directly on them. Century Splash Proof motors eliminate production losses due to dripping or splashing liquids or falling solids. They also protect against rain, snow, sleet or hail on outdoor installations.

Century Splash Proof motors are available in a wide range of types and sizes for all popular applications. Other types and ratings are available to meet your electric power requirements. You can specify Century motors with confidence.

Century motors are built in sizes ⅓ to 400 horsepower.

697

CENTURY ELECTRIC COMPANY, 1806 Pine Street, St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

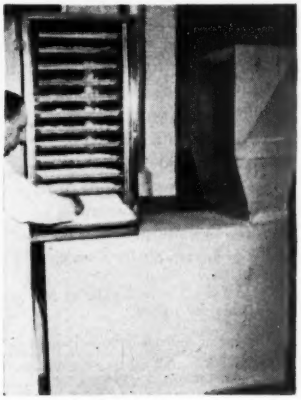
Making the Fried Nests

OPERATOR immerses tray of molded noodles into deep-fat fryer, while fat drains from fried noodles (right).

GIRLS package four nests into each retail carton, and two-dozen lots in cartons for institutional trade.

Processing Concentrated Consomme and Dehydrated Meat Bases

CONSOMME, concentrated in kettle (left), is vacuum-filled in jars (right).



MEAT BASES take only 1 hr. to dry in this special, 12-tray unit . . .

. . . **THEN** dehydrated bases are filled into 1- or 2-oz. envelopes.

Production of instant consomme involves but two steps—cooking and bottling. Into a 150-gal. stainless steel steam jacketed kettle are weighed beef extract, dehydrated vegetables, monosodium glutamate, spices, and water. As these ingredients are being cooked at 212 deg. F. for 24 hr., they are constantly mixed with a Lightning propeller-type agitator. The consomme is then pumped to a double-spout vacuum filler that puts it up in 6, 16, and 32-oz. bottles.

Beef, Chicken Bases

Now to the manufacture of dehydrated beef and chicken bases:

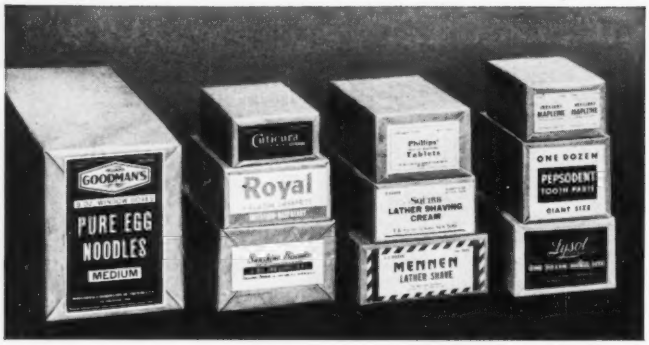
The ingredients—beef or chicken extract, dehydrated vegetables, spices, and water—are cooked for 2 hr. at 212 deg. F. in the steam-jacketed kettle. Then the contents go into a mixing bowl, and a thickening agent is added and blended with the base by a vertical, beater-type mixer.

Drying is the next step. The liquid base is poured into twelve stainless steel trays, each holding about 12 lb. Trays (3x24x42 in.) are stacked in a company-designed cabinet dryer. Drying takes 1 hr.

Air is duct-fed through four Fiberglas filters. After passing over a row of gas burners, the hot air is circulated around the trays in cycles. An automatic timer alternately starts and stops the circulating fan to control the drying temperature at 200 deg. F.

Dried meat bases are next ground in a hammer mill, then dumped into a horizontal mixer along with salt and monosodium glutamate. Finally, the dried meat bases are moved to the packaging department, where they are put up for the retail trade by a Brown bag-filling machine. This unit takes the 1 and 2-oz. envelope-bags from a magazine, opens them, and volumetrically measures and fills in the powder. Top flap of each envelope is then automatically glued and sealed.

For the institutional trade, the beef and chicken bases are packed into 5, 10, and 30-lb. fiberboard drums.



MACHINE BUNDLING
A Great Cost Reducer

The products illustrated above are but a few of the many now being bundled on our machines.

The rapid growth of machine bundling is due to the large savings it makes. And you'll be surprised at what a strong, protective bundle our machines make. Practical not only for goods in cartons, but also for bottled products in cartons.

A single roll of strong kraft paper, as used on our machines, will produce hundreds of bundles. You can readily see how great a saving this makes over the cost of cardboard boxes or fibre containers. Shipping costs, too, are lowered because bundled goods weigh less.

The machine bundles a dozen, half dozen or any desired quantity of cartons within its size range. It can be equipped with an automatic assembling unit, mounted at the infeed, to assemble the packages in the best arrangement for a compact bundle. Easily adjustable for a wide range of sizes.

For further information, write our nearest office

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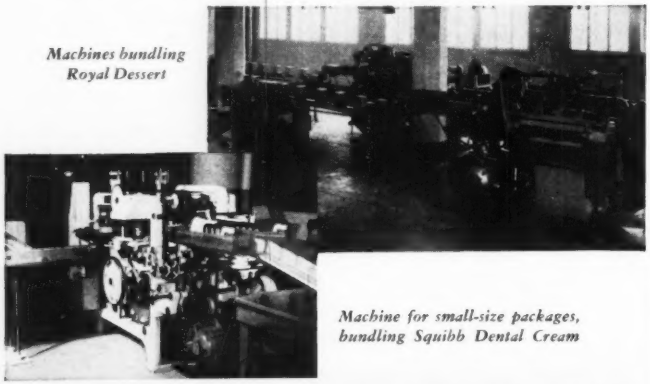
NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS DENVER
LOS ANGELES SAN FRANCISCO SEATTLE VANCOUVER, WASH. TORONTO MEXICO, D.F.

Machines bundling Royal Dessert



Machine for small-size packages, bundling Squibb Dental Cream

PACKAGE MACHINERY COMPANY

LETTERS TO THE EDITOR

Imitation Jam NOT Illegal

Editor, FOOD ENGINEERING:

My attention has been directed to the article, "Legal 'Short Course'," by Leo T. Parker (p. 98, Feb. FE). Under the subtitle, "When an Imitation Food Product Is Legal," the author discusses a case brought under the Food, Drug & Cosmetic Act involving imitation jam.

He states: "Hence, a jam which does not comply is considered misbranded, although the product is labeled 'Imitation' and it contains pure ingredients of high food value."

The author is quite confused, and I am afraid that his readers will be equally confused. He discussed the decisions of the Federal District Court and the United States Court of Appeals without taking the trouble to consult the decision of the United States Supreme Court to which appeal was taken.

In March of last year, the Supreme Court held that the product involved in the litigation, which did not conform to the standard of identity for jam, could be sold in interstate commerce under a label which plainly described the product as an imitation. —*Daniel R. Forbes, Counsel, National Preservers Assn., Washington, D. C.*

Author's Comment

Editor, FOOD ENGINEERING:

The United States court decision (183 Fed. 2d 1014) was reversed by the U. S. Supreme Court (71 Sup. Ct. 515). Hence the Supreme Court has decided that a wholesome jam is not mislabeled if the label plainly describes the jam as an imitation.—*Leo T. Parker, Attorney at Law, Cincinnati.*

Anti-Bacterial Cement

—*Continued from page 60*

ABC's cementing ingredients react identically to those of Portland cement. The Portland Cement Assn. has correlated the results of exhaustive research into detailed instructions for all types of masonry. Frequently, the only difference between a poor structure and a good one is merely a few minutes of planning time. This is time particularly well spent—for then the job itself will proceed more smoothly,

and the resulting unit will always reward with longer useful life.

When employing ABC, it is essential to always follow the Associations recommendations for heavy duty masonry. These need not be reviewed here–they are available from the Association's office, 33 W. Grand Ave., Chicago 10.

Points to Remember

It is stressed, however, that the planner must always remember that the 'dense' mix for heavy duty masonry never requires more than 5 gal. of mixing water per sack of cement, and that here the moisture carried by the aggregate must be included in the calculation; that in concretes, 1 part of ABC should be accompanied by no more than 1 part fine, and 2 parts coarse aggregate; that in mortars, 1 part of cement to 2 parts of fine aggregate are suitable for wall and ceiling finishing, or tile grouting; but in floors, 1 part cement to 1½ parts of fine aggregate should be used, excepting in gutters and at drain mouths, where 1 to 1 is preferable.

The layout should be planned for efficiency. Where permanently emplaced equipment is to be drained regularly, gutters should be used. These will keep the balance of the floors substantially dry, and will improve working conditions. The pitch of floors and gutters to drains must be worked out carefully. Expansion joints should be used as specific requirements may dictate.

The new material is more expensive than Portland cement. It is most economically employed in two-course construction. This is not difficult, provided the practical guidance of the Portland Cement Assn. is followed. When the new masonry is to be laid over old, the base course must be prepared fully, as recommended by the Association, and the ABC course should be adequately heavy for the job's demands.

A ¼-in. coating is satisfactory for walls and ceilings, floor tile grouting, and integral masonry in low traffic zones. A thicker layer–not less than 1½ in.–should be used when traffic is heavy.

This cement will always protect the masonry against damage from microbiological metabolism. To help control airborne contamination, the new surfaces must not be masked-off. As for coloring the masonry, North American is prepared to suggest compatible pigments.

End (Resume reading on page 61)

Better Food for Navy

—Continued from page 61

12. *Concentrated milks.*

Not all of those items have come into extensive use in the Navy. But some–such as the frozen juice concentrates and frozen fruits and vegetables–are showing their merit. The others have to prove their utility and sell themselves. Some–such as dried eggs and dehydrated vegetables–have to buck the great amount of prejudice created by products served in the last war.

What Is Needed

The Commissary Research Division feels that the following problems will have to be solved to make further im-

Coming Soon in FOOD ENGINEERING

Scores of practical "how" articles—all down-to-brass-tacks to help you produce higher quality foods at lower costs—are in preparation for early issues of FE. Just to name a few—

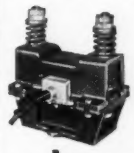
Technologist Pinpoints Recent and Future Progress
Mechanization Cuts Costs in Confectionery Plant
Bakery Engineers Production-Line Advances
Dairy Builds Business by Creative Processing
Simplified Byproduct Handling in Meat Plant
Swift Beverage Syrup Chilling with City-Water Savings
New Refrigeration System Installed in Brewery
Cereal Processor Puts Control on Graphic Basis
Frozen Food Warehouse of Unique Construction
Agitator Cooker-Cooler Speeds Heat Transfer in Cans

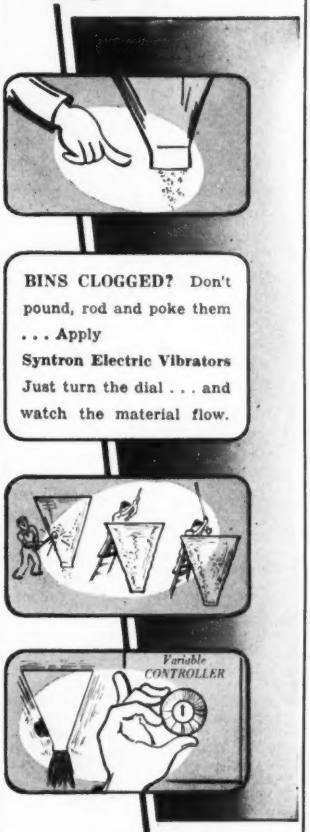
SYNTRON

"Pulsating Magnet"

Electric Vibrators

The Way to Assure Free-Flowing Hoppers, Bins and Chutes





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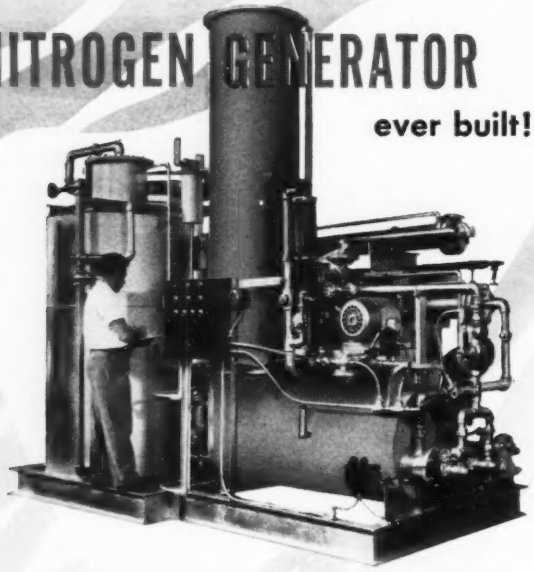

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The Gas Atmosphere Nitrogen Generator has maximum flexibility — impartial laboratory analysis shows 99.9 per cent Nitrogen, or up to 10 per cent combustibles in Nitrogen can be continuously maintained. Many other exclusive features make the G-A Generator the best, most efficient generator ever built.

ORIGINAL G-A DESIGN COMBUSTION CHAMBER — Reboiling method of reactivation of CO, absorbing solution first adapted to nitrogen generators by Gas Atmospheres, Inc. Of compact design this method assures highest efficiency — most economical operation.

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provements in the food for the Navy.

1. **Premixed bread and bakery products will have to maintain their rising vigor without change in flavor for at least one year of storage at 100 deg. F.**

2. *Some satisfactory method must be found for extending the storage life of fresh fruits and vegetables two or three times beyond the present limits.*

3. **A procedure will have to be worked out to freeze eggs to be used in "eggs to order," and yet maintain the characteristics of the fresh eggs when thawed. Another desirable product is a liquid egg which can be stored in chill or dry storage, yet be prepared as scrambled eggs with the same acceptability as if made from fresh eggs. (How tough can these problems be?)**

4. *Concentrated fruit juices must be developed which can compare favorably with the present frozen 3-1 or 4-1 concentrates in flavor, but which can be stored without refrigeration.*

5. **Dehydrated carrots, sweet potatoes, tomatoes, and cabbage are desired which will compare favorably with the fresh counterparts. All dehydrates should stand up for a year's storage at 100 deg. F.**

6. *A reliable, inexpensive way must be worked out to preserve cereals, flour, and premixed bakery products from insect infestation. This may be done by pressure, gases, impervious packaging, or some other means. Sooner or later someone will do it to the Navy's satisfaction.*

7. **A dried milk is needed which, when reconstituted, will have the same acceptability as fresh milk, yet will have desirable baking characteristics. It should not be necessary to ship water or to carry two or more dried milks to fulfill the milk craving of the sailor.**

8. *Processors should give plenty of thought to canned baking fruits which are concentrated to occupy only a fraction of the volume of the presently used fruits. And their processing will have to be a relatively inexpensive procedure.*

9. **Since freezing space on vessels is at a premium, more rations of meat will have to be placed in less space to make room for other frozen products. Prefabrication may be part of the answer, but this is expensive. Boneless turkey roll is a partial answer, but it is expensive, too. Besides, some of these rolls have elicited complaints of off-flavor in the dark meat. It may be that cut-up turkeys, halves, quarters, or compressed packs may help. With the beef and other meats, it will take plenty of doing.**

10. *Of course, if it is possible to put up an acceptable canned meat at a reasonable cost, this will take part of the pressure off the freezer capacity. Some success has been obtained with*

Doesn't Your Business DESERVE the BEST in Sanitizing Agents?

The ORIGINAL Quaternary Ammonium Germicide

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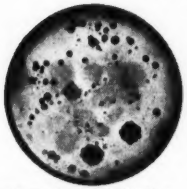
SANITIZING AGENT

to do a more effective sanitizing job throughout your plant!



Petri dish showing colonies of bacteria before the use of ROCCAL.

Petri dish showing no bacterial growth after the use of ROCCAL.

In the Food Industry, the importance of using only the best in sanitizing methods cannot be over-emphasized.

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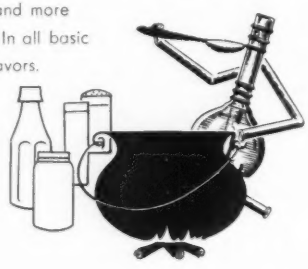

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canned meat loaf, pot roast of beef, and roast pork. But except for the former, less than 60 percent of the can contents is meat. When one or two pieces of meat are processed in a large 8-lb. can, the canned meat flavor is still evident. This poses problems of which the industry is well aware.

11. **The can manufacturers better not be complacent, either, because an inexpensive square-corner can still is needed for a variety of products. Will it ever be made strong and cheap?**

12. *Coffee concentrate still is elusive. Innumerable samples have been tested, and it still is not possible to please the vociferous 10 percent who take their coffee black. They spot the concentrate extract or powder every time by its lack of aroma.*

13. **Beverage-powder people will have to do better, too. It must have a fulsome, natural flavor and good color. This powder must reconstitute readily —no lumps—and it should present no storage difficulties. Colored citric acid crystals do not make a suitable beverage base.**

14. *Another much-desired development is some means of accurately determining flavor acceptability without taste panels. This will enable the writing of another control into purchase specifications and thereby assure constant good-quality food for the Navy. (This really is looking into the depths of the crystal ball!)*

Still More Problems

Of course, there are many other problems in Naval commissary food research which need correction or development work. These include the following:

1. Rapid tests which Navy bakers can use to evaluate the activity of dried yeast and strength of baking powders—alone or in premixes.

2. Dried meats with good storage characteristics and high acceptability.

3. Dehydrated meatless-type stew mixes.

4. Dehydrated bananas and strawberries of high acceptability and good storage and reconstituting characteristics.

5. Fresh meats that are canned or preserved without freezing so that they can be kept in the dry storeroom.

6. Dehydrated soups which can be dehydrated to compare with the best canned soups.

7. Inexpensive method of packaging or treating butter so that it need not be stored in the freeze box aboard ship.

8. Development of a dehydrated potato granule which does not require rigid control of the added-water temperature.

End *(Resume reading on page 62)*

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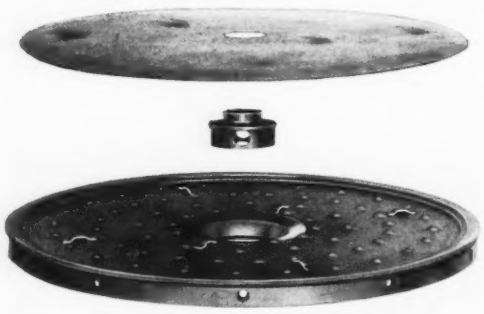

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Complete sanitation with

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The illustration above shows at a glance why Sparkler Filters are the most sanitary, most efficient filters ever designed.

Starting with the basic part of any filter — the filter element — Sparkler design makes every surface easily accessible for thorough cleaning. The few simple parts in the photo represent a complete Sparkler horizontal filter plate, with no cracks, crevices, or hard-to-reach parts that can imperil product purity by retaining objectionable material.

Once the cartridge of plates is removed from the filter, disassembly is quick and easy. Just loosen the tie-rods and the plates come apart in 1 - 2 - 3 order. Lift the paper off, remove the perforated metal wafer, then remove the supporting plates. One man does the entire job in a matter of minutes.

Inside the tank, too, complete sanitation has been provided for. All surfaces are smooth, and all joints are rounded off for accessibility and thorough cleaning.

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Write Mr. Eric Anderson for full information or engineering assistance

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How Nutrients Are Lost

—*Continued from page 63*

their gradual spoilage. But enzymatic changes are retarded by refrigeration and blanching. One of these enzymes is ascorbic acid oxidase, which catalyzes the oxidation of vitamin C.

Milk may lose a fourth, or more, of its vitamin C during pasteurization, and even more when evaporated. Orange juice also contains ascorbic acid oxidase which hastens its destruction. Vacuum concentration and freezing preserves both the vitamin and the enzyme. That is why reconstituted orange juice concentrate will gradually lose vitamin C after reconstitution.

So close is the correlation between loss of vitamins and deterioration of flavor that the development of flat or off-taste indicates vitamin loss.

Incidentally, the presence of the minutest trace (as little as one part in 20 million) of copper ion will greatly accelerate the rate of ascorbic acid oxidation.

Other Water-Solubles

In addition to those mentioned, there are many other water-soluble vitamins (see table). They include pyridoxine, pantothenic acid, folic acid, biotin, and so on, down to cobalamine, or vitamin B_{12}, whose role in normal human nutrition is less well understood. We know, for example, that folic acid and vitamin B_{12} are highly specific for the treatment of pernicious anemia. But dietary deficiencies of these, as well as other vitamins of the B group (aside from thiamine, riboflavin, and niacin), fortunately are rare.

Fat-Soluble Vitamins

When we come to the oil- or fat-soluble vitamins, we encounter first vitamin A and its precursors, the carotenoid pigments of plants. All of these are highly susceptible to oxidation. The exposure of large surfaces of vitamin A-bearing foods to air, particularly at elevated temperatures or in the presence of sunlight, will increase the rapidity with which the vitamin disappears. Were it not for the natural antioxidants present in many foods containing vitamin A, the loss of this nutrient would be even greater.

The food technologist who wishes to preserve the vitamin A uses vacuum or inert atmosphere, especially when heat is to be applied to the product. Or he may employ antioxidants or protective coatings. Aeration of milk—or the churning of margarine, butter, or

(*Turn to page 148*)

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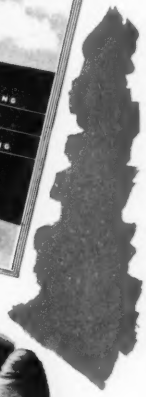

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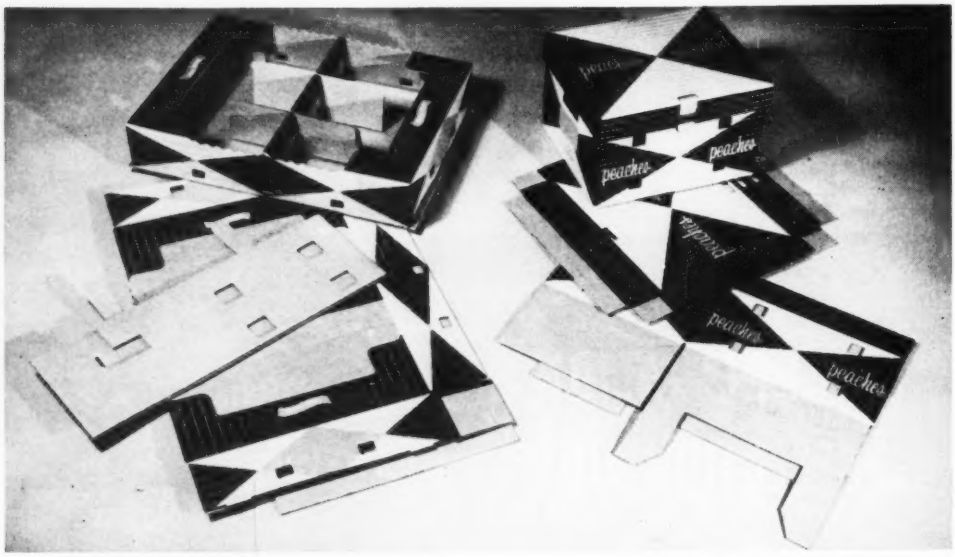
NEW PACKAGES & PRODUCTS



New Type Corrugated Shipping Cartons for Fruits, Berries

Two new corrugated containers to handle shipments of peaches and berries have been introduced by Twin Cities Container Corp., Benton Harbor, Mich.

One is a ½-bu. peach box, the other a container for pint and quart-size berry boxes.

Shipments of these highly perishable products in these containers have met with outstanding success, according to the company, which states repeat orders are coming in rapidly.

Users include Simpson Sales Agency, Hammond, La., William Brand Produce Co., Atlanta, Ga., and South Carolina Peach Growers Assn., Spartansburg, So. Car., as well as strawberry, blueberry, and raspberry growers throughout lower Michigan.

Some of the features of these cartons:

1. Cost and space of shipping and storing empty cartons minimized. The boxes are constructed in such a way that they can be shipped in a "knock-down" flat manner, thus taking little space. Lightness of the material reduces the weight factor to a minimum.

2. Assembly time cut. There are but two pieces to each carton, with cutouts or creases indicating fold and interlocking areas. No tape or stitching is used anywhere in the assembly. This means they can be set up quickly and simply.

3. Packing ease. Packing is simplified by the fact that the cartons are without protruding flaps, handles, or other impedimenta while on the production line.

4. Safety in shipment. Containers are sturdily built of water-resistant corrugated paperboard, and can easily be stacked and shipped without further packaging. A glue strip across the end of each box keeps the cartons from shifting when stacked. This glue remains tacky to the touch, but is not tacky enough to injure the carton. Also, when packed one upon the other the flouncing on the sides of the cartons allows for sufficient ventilation. Each carton has an additional liner of corrugated adding to the strength of the box, and thus giving additional protection.

5. Attractive retail display. The cartons lend themselves to good store display due to their compact, neat construction. Display is also facilitated by the stacking features. Uniform packing of the produce and its clear visibility accent sales appeal to the customer.

For Package Data Use Reader Service

Latest Thin Bread

Latest item to be added by Hines-Park Foods, Inc., Ithaca, N. Y., is a loaf of thin-sliced bread, which brings to about 160 the number of different foods under its Duncan Hines label.

It is presently being offered by Durkee's Domestic Bakery, Inc., Homer, N. Y. However, it is expected that franchises will be granted to select bakers throughout the United States to produce the special-recipe home-style loaf.

The bread is wrapped in white with the red and blue standard Duncan Hines logotype and trademark.

IMPULSE SALES INCREASE

with Colorful Cap Design

There's plenty of evidence to prove that a bright package boosts pickup sales. This is particularly true in self-service food stores, where 66% of all purchases are made on impulse. An Armstrong cap makes your product stand out on dealers' shelves . . . attracts customers . . . closes sales.

Plain price marking, too, is another "must." Nothing kills an impulse sale quicker than uncertainty about the price of an item. Armstrong's experienced designers can style your cap design to include a space for dealers' price marks. A special no-wax finish makes it easier to write on an Armstrong cap.

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6 Items in Modern Trend

Attractive packaging, advanced processing, and cognizance of what a consumer demands are all taken into consideration in present day marketing. Shown above are examples of some of the items which most recently have attracted consumer interest by incorporating these ideas.

In the seafood line, a product highly acclaimed is a 6-oz. carton of frozen Alaska king crabmeat, product of Wakefield's Deep Sea Trawlers, Inc., Seattle.

The meat is carefully cleaned and separated into good-sized segments. It is then cooked, frozen, and packed aboard ship in the Alaskan waters where it is caught. The meat is wrapped and sealed in cellophane, then packaged in an attractive waxed chipboard carton.

This carton is illustrated with suggested uses—in cocktails, salads and casserole dishes. And on slitting the carton, as instructed, the consumer has access to the inside of the container where various recipes are given for preparation of various dishes. Carton is supplied by Fibreboard Products, Inc., Portland, Ore.

For the small family, H. J. Heinz Co., Pittsburgh, is now marketing beef stew and also lamb stew in 8½-oz. sizes. With the famous "57" Heinz trademark, the cans present an impelling appearance with their colorful label in maroon, yellow, and green, which also includes illustrations of the stew itself.

And now, too, the housewife is offered uniform cubes of potatoes for hash browning without any of the fuss or work. Clinton Foods, Inc., New York, is now marketing, under the Snow Crop brand, a 16-oz. carton of the quick-frozen product with an onion flavor. These are Idaho potatoes, cleaned, diced, and frozen raw, ready for crisp hash browning.

Packed in the conventional chipboard frozen food carton, they are overwrapped with "Glosseal," a product of Western Waxed Paper Co., San Leandro, Calif.

Cheeseburgers, one of America's favorites, are now offered in frozen form by Excelsior Quick Frosted Meat Products, Inc., a New York City company.

The 6-oz. carton contains two servings. Each serving is composed of two layers of chopped beef between which is a slice of pasteurized process cheese spread with bacon.

They are packaged in the conventional frozen food chipboard box with an appetizingly illustrated waxed paper overwrap. Portions are kept separated by a waxed piece of chipboard within the carton.

Finally, we have an item that is far from new but has just recently made its reappearance on the general market—pure vanilla beans.

Imported, the beans have not been available in quantity for consumer use. Now, however, Seeman Brothers, Inc., New York City, is making this item available to the housewife, under the White Rose label.

A long strip of the bean is placed in a glass tube, corked, and sealed with paraffin to insure its freshness. Label gives instructions for use to those unfamiliar with the old-time method of preparing vanilla.

For Package Data Use Reader Service

Same Pack, Larger Bag

The 1- and 2-lb. packages of dried beans and peas marketed by Colorado Milling & Elevator Co., Denver, are now being supplemented by a 5-lb. bag.

Like the smaller containers, the new bag is fabricated of cellophane and carries the same Ranch House label.

Gravure-printed, the bag is designed not only to attract consumer attention but has an added attraction in its

re-use value for storage of other food items or carrying picnic sandwiches and the like.

Called the Shellen bag, it is designed and manufactured by Shellmar Products Corp., located at Mount Vernon, Ohio.

For Package Data Use Reader Service

Apple Syrup Offered

Called "Apple-Flo," an apple syrup is being marketed by Dutchess County Apple Mills, a Rhinebeck, N. Y., company.

Made from pure apple juice and cane sugar, its appearance is clear and golden and its consistency is similar to that of maple syrup.

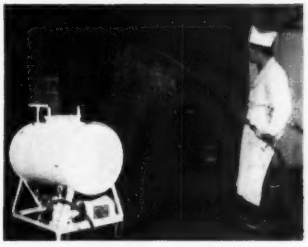
At present it is being offered in a 12-oz. bottle. Meanwhile, plans are underway to pack gallon tins for institutional use.

The glass containers are furnished by Owens-Illinois Glass Co., Toledo, Ohio, and labels by The American Label Co., New York City.

For Package Data Use Reader Service

Just flip the switch to do any cleaning job faster

Clean up to 1200 sq. ft. in half an hour —cut cleaning costs to 2¢ per sq. ft.



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All you do is make up the cleaning solution in the tank of the Unit—flip the switch, open the valve, and start spraying. Unit discharges up to 1¾ gallons of cleaning solution a minute under 50 pounds pressure—cleans areas up to 15 feet away from spray nozzle, up to 50 feet away from Unit. And you can wheel it about your plant to clean equipment in place—tanks, tables, floors, fillers, conveyors, ovens, cellars, refrigerating rooms, trucks, etc. Tops for paint stripping, too.

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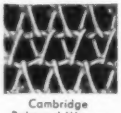
CONVEYOR BELT

Whether you're freezing vegetables, meats or fruit products . . . in bulk or I. Q. F. . . . there's a Cambridge woven wire conveyor belt to help you cut freezing costs by combining movement with processing all along your production line.

For example, this photo shows a specially designed Cambridge belt carrying asparagus spears from a wash tank prior to freezing. Other belts may be used on inspection tables, in blanchers, on packaging and labeling machines, in freezer tunnels.

The moving belt eliminates manual handling, helps maintain product uniformity. All-metal construction gives longer belt life and lower maintenance costs. Open mesh of the belt provides free drainage of wash waters as well as free circulation of air in the freezing tunnel. Special side or surface attachments are available to meet individual requirements.



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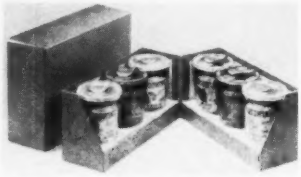
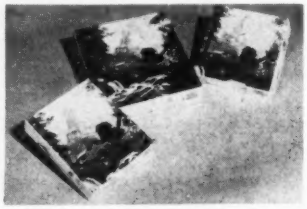
Food Items Take NPBMA Package Awards

In the food field, preserves, cheese, and candy packages took awards given out by National Paper Box Manufacturers Assn., Inc., at its recent convention in Chicago. Candy packages led in number of honors. See below—

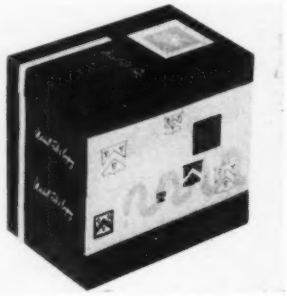


First Award in Food—Jelly Box. To the Bradley & Gilbert Co., Inc., Louisville, Ky. Product of Goodwin Preserving Co., Louisville.



Second Award in Food—Cheese Box. To Janesville Paper Box Co., Janesville, Wis. Product of Swisconsin Chalet, New Glarus, Wis.

First Award in Confections—Candy Box. To The Congress Paper Box Co., Inc., Chicago. Product of Martha Washington Candies Co., Chicago.



Second Award in Confections—(Also Honorable Mention for best artistic design)—Three-Tier Candy Box. To The Congress Paper Box Co., Inc., Chicago. Product of Marshall Field & Co., Chicago.

Honorable-Mention Awards went to the following:

In Food—Cheese Gift Assortment. To The Congress Paper Box Co., Inc., Chicago. Product of Sue Ann Food Products Co., Chicago.

In Confections—Mint Cordials Pack. To San Jose Paper Box Co., San Jose, Calif. Product of Chase Candy Co., St. Louis, Mo.

Party Mix Box. To Utah Paper Box Co., Salt Lake City, Utah. Product of Sweet Candy Co., Salt Lake City.

Assorted Candy Box. To W. H. Albrecht Co., Philadelphia. Product of Gimbel Brothers, New York City.

For Package Data Use Reader Service

Two Win FPBAA Honors

Also recently honored were two package designs by Robert Gair Co., Inc., New York City. Here the awards made at the carton competition of the Folding Paper Box Assn. of America at its Chicago meeting were as follows—

First place in food: To the family of cartons for the Alloro line of macaroni and spaghetti made by Quaker Maid Co., Inc., a manufacturing subsidiary of The Great Atlantic & Pacific Tea Co.

Honorable mention in the beverage classification: To the combination Foiline, Plastafol, and Tufboard carton made to hold two bottles of Moet & Chandon champagne, distributed by Schieffelin Co., New York City.

Want More Packaging Data?

You can get additional information —gratis—on any specific packaging materials mentioned in items of this department. Just note the items naming the materials and suppliers, then find the keyed page numbers under "Packaging Materials" in Reader Service, inside the back cover. Circle each number on the handy postcard, sign, and mail. No postage is needed.

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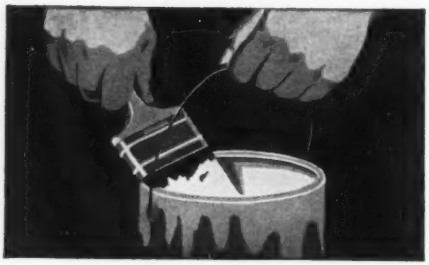

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How Nutrients Are Lost

—Continued from page 140

other food emulsions in air—do very little good so far as vitamin A potency is concerned. The catalytic effect of light on the destruction of vitamin A is responsible for the fact that cod liver oil is sold in dark glass containers.

Certain enzymes like carotenases and other lipoxidases have a destructive action on the vitamin or its precursors. The presence of metallic ions, particularly ferric iron, adds another burden to the vitamin in its fight for survival under conditions of atmospheric oxidation.

One of the most stable of all the vitamins is D. But certain special situations are conducive to oxidative loss of this vitamin. Exposure over the surface of certain mineral salts, such as calcium salts and dried whey, results in rapid deterioration. This is of particular importance to animal-feed manufacturers.

One of the principal functions of the tocopherols in foods is their role as natural antioxidants. Of course, this group of compounds also includes vitamin E, or the antisterility vitamin. Like all antioxidants, the tocopherols are themselves easily oxidized. Among the factors which accelerate this oxidation are ferric ions and the presence of rancid fat. Conditions which maintain vitamin A potency will simultaneously protect tocopherols.

Vitamin K is a fat-soluble vitamin required for maintaining the normal capacity of the blood to coagulate. It is one of the vitamins synthesized by bacteria in the intestinal tract. Deficiencies have been known to occur only when there is failure of absorption of fat and hence also of the fat-soluble vitamins.

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This article is based on a talk before the Association of Consulting Chemists & Chemical Engineers, New York City, Apr. 22, 1952.

End (Resume reading on page 64)

HYSTER® TURRET TRUCK "hustles" the loads in FOOD WAREHOUSING and MANUFACTURING

The "hustling" Hyster Turret Truck is a natural for transporting jobs in the fast moving food warehousing and manufacturing field.

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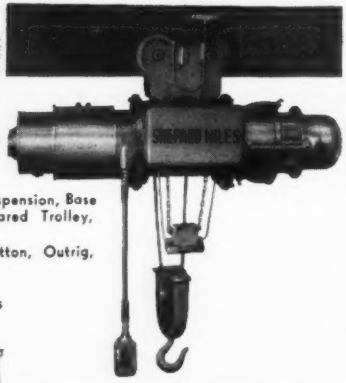

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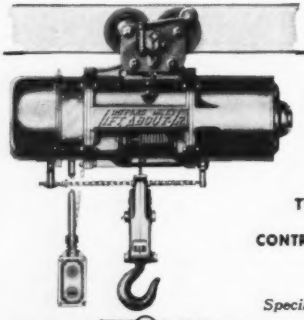

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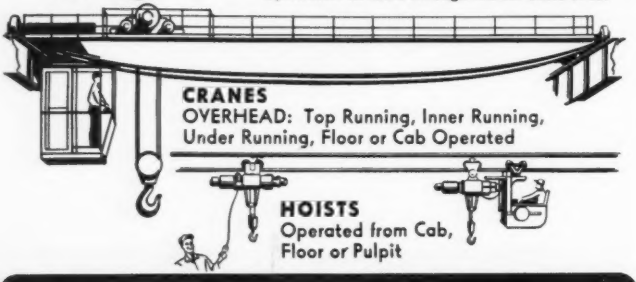

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Beef "Cocktail"

—Continued from page 67

tion of our laboratory. This permits complete control over initial runs, and further data can be obtained. We have also found this advantageous in that much of the equipment used is of dairy-type construction and unfamiliar to most meat-plant personnel.

Our meat is gathered from a whole beef carcass. By blending beef trimmed from a single animal, we have less variation in ingredient quality and more uniformity in product taste. And while using unit carcasses—rather than cuts—does entail more work, it greatly simplifies accounting and allows the selection of graded beef.

All beef is carefully trimmed of fat. A low fat content of about 3 to 5 percent in the final product prevents fat from "breaking out" of suspension and permits the use of a high proportion of meat in the final product. The lean beef is thoroughly ground in a conventional grinder and placed in a large stainless steel cooking kettle, together with water, vegetables, potatoes, and seasoning. The cook is like that with beef stew.

After a short cook, the product is pumped through a comminuter and further particle-size reduction follows. This does not completely break up the meat, but reduces it to a size that will stay in liquid suspension.

Stainless steel pipe then delivers the product to conventional can filling and closing machines, and retort sterilization follows.

Possibilities Are Many

In its handy liquid form, the new meat product has many possibilities, which are just starting to be explored. Its ease of handling suggests its use as a flavoring as well as a complete "meal-in-a-hurry."

Further, reactions from medical people and nutritionists indicate that it has good prospects as a special dietary food. It is conveniently incorporated into other foods when it is desirable to prepare special dietary foods of high protein content. Its natural palatability certainly has considerable appeal over protein hydrolysates often used in the medical field.

Processing possibilities also are in the early stage of elaboration. Improvements in the product are seen through the application of such newer technics as aseptic canning and nitrogen packing. So when the process is ultimately set up for high-volume production in the plant, it undoubtedly will contain many refinements.

End (Resume reading on page 68)

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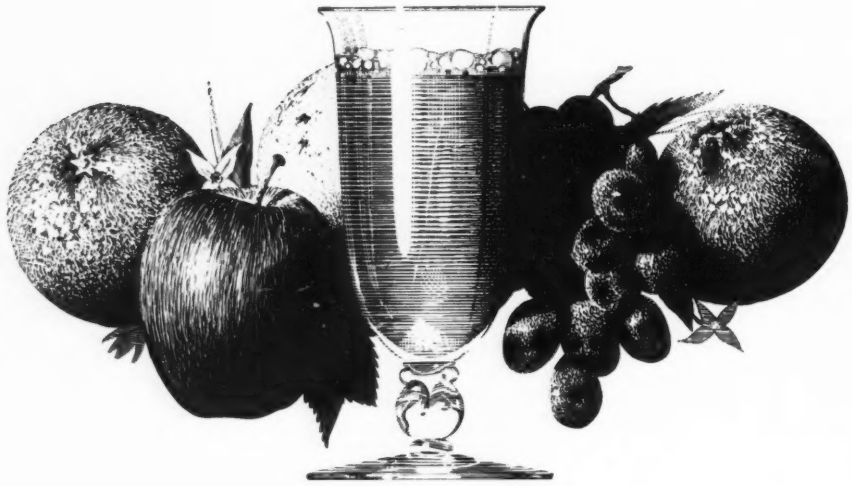

Did you know that ascorbic acid may be added to certain fruit and vegetable juices to standardize their vitamin C content, thus overcoming wide variations which can occur *(see table below)*. Many nutritionists believe that the public interest is best served when the ascorbic acid content of processed juices is so standardized. The cost is nominal, the processing simple. A label statement of 100% of the minimum daily adult requirement for essential vitamin C may be made when a serving of juice contains 30 mg. of ascorbic acid.

Why send your juice to market with the "handicap" of inadequate nutritional value? Use Roche ascorbic acid to standardize its vitamin C content. We have helped many processors to make their good foods better and we're ready to help you. Why not investigate today?

Ascorbic Acid Content of Canned Juices

Below are examples of minimum and maximum levels of ascorbic acid in commercially canned juices. Note the wide variations! All figures are in milligrams per 100 grams of juice. Data from U. S. Department of Agriculture.

	Min.	Max.
Grapefruit juice	10.0	49.0
Orange juice	9.7	70.0
Pineapple juice	5.4	18.0
Apple juice	0.2	3.6
Grape juice	0.0	4.7
Tomato juice	2.5	32.0

It is in the public interest to standardize the vitamin C content of these processed juices.

Orange — Grapefruit — Tangerine — Apple — Grape Pineapple — Cranberry — Tomato — Vegetable blends

No matter which type of processing you use— Canning • Concentrating • Freezing • Dilution in the form of "ades"—your juice will be better when its ascorbic acid content is standardized.

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ADVANCES IN TECHNOLOGY

Times and Temperatures of Processing Steps Influence Solubility of Nonfat Dry Milks

Successful manufacture of low-heat nonfat dry milk depends upon adequate control of times and temperatures in processing steps, particularly in the evaporators.

For, although protein denaturation is no more serious for a given heat treatment in the vacuum pan than in the pasteurizer, the time element is not so obvious in operation of evaporators.

Excessive denaturation of serum proteins cannot be avoided if the first stage of a multiple effect evaporator is operated above 160 F. Even a single-effect pan, if operated at above normal temperatures, will result in excessive heat treatment.

Proper pasteurization causes no measurable protein denaturation. And time and temperature of exposure of condensed milk particles during spray drying are not sufficient to cause changes.

Digest from "The Effect of the Various Steps in the Manufacture on the Extent of Serum Protein Denaturation in Nonfat Dry Milk Solids," by H. A. Harland, S. T. Coulter and R. Jenness, *Journal of Dairy Science*, 363-68, April, 1952.

Novel Frozen Confection

Apparatus has been patented for producing a frozen confection that is ornamented and flavored in a variegated pattern of horizontal layers or annular stripes.

In its preferred embodiment, a frozen, cone-shaped mass of plain shaved ice, sherbet, or ice cream is rotated in the spraying zone of a series of nozzles connected with sources of various colored and flavored syrups. Or, the apparatus may raise the mass into the zone of a series of ring jets that spray the cone with annular areas of colored flavoring material. The product is the same in either case, and the object is to enhance the appearance of the confection with a varicolored coating.

Digest from U. S. Patent 2,579,696, issued Dec. 25, 1951, on an application dated Aug. 2, 1948, to David L. Perlman, Baltimore, Md.

Dried Buttermilks Give No Clue To Quality of Source Creams

In the hope of finding certain factors that might correlate dried buttermilks and the creams from which they were prepared, an investigation was undertaken to determine whether sufficient proteolysis took place in cream, before churning, or in the buttermilk, to be reflected in the ammonia content and formol titration values of dried buttermilk.

Creams were obtained from different sources in order to introduce as much variation as possible. Some were naturally ripened, and others inoculated with *S. lactis*, *E. coli*, or *A. aerogenes*.

For naturally ripened creams, ammonia values of liquid buttermilks increased as the acidity at the time of neutralization and pasteurization increased. Drying drove ammonia from the samples and practically eliminated differences among the various buttermilks.

Formol titration values increased to a less degree with cream acidity and were lowered to a greater degree by neutralization and pasteurization than were the ammonia values. Differences were eliminated by drying. Results with pure cultures varied with the organism, and results with any one were not in accord with those obtained with naturally ripened creams. The conclusion was reached that ammonia and formol titration values can not be used to estimate the quality of cream from which the dry buttermilk was produced.

Digest from "The Ammonia Content and Formol Titration of Roller-Dried Buttermilks as Indices of the Quality of the Source Creams," by V. C. Vandevender, Jr., H. G. Lyon, and E. W. Bird, *Journal of Dairy Science*, 116-27, Feb. 1952.

FRUITS & VEGETABLES

Strawberry Preserve Color

Deterioration in color of strawberry preserves is due to loss of natural red anthocyanin pigment; formation of brown pigment resulting from the browning reaction, and discoloration caused by such factors as heavy metal contamination.

Pigment content alone is no criterion of an acceptable color, but a decrease in brightness means development of browning and an immediate loss in attractiveness.

A brightness of 6 percent or more, coupled with a pigment content of 3-5 mg. per 100g. would appear to be ideal.

As between immature, ripe and overripe berries, immature fruit has poorer color and less flavor. It is important, since initial anthocyanin content should be high, to avoid immature fruit.

Vacuum cooking and use of liquid sugar are reported to have slightly beneficial effects.

Digest from "Progress Report on Strawberry Preserve Color," a paper by G. Mackinney and C. O. Chilchester given at 1952 Annual Meeting of The National Preservers Assn., Chicago, March 4, 1952.

Blanching Fresh Vegetables Destroys Ascorbic Acid

An attempt was made to determine what relationship, if any, exists between the inactivation of certain enzymes and the retention of ascorbic acid in frozen vegetables. The study included determination of ascorbic acid content and the activities of catalase, ascorbic acid oxidase, peroxidase, and polyphenol oxidase in broccoli, green beans, lima beans, peas, spinach, and summer squash.

The hand-picked vegetables were blanched for ½-4 min. in water at 200 F., drained and cooled in ice water. The chilled vegetables were drained, reweighed, and packed into tin cans

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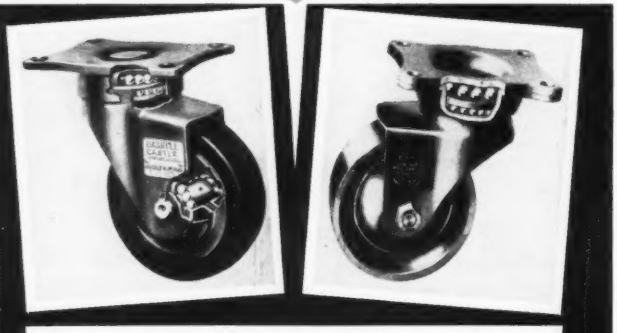

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which were sealed and placed in a freezing unit at 0 F. They were removed at certain intervals for ascorbic acid analysis and for enzyme tests.

Weight changes were relatively small for all vegetables except spinach, which lost 15-25 percent of its original weight during blanching. Vitamin values for this vegetable were only calculated to the fresh weight basis. Blanching caused marked losses of ascorbic acid in every case, and additional losses occurred during freezing and frozen storage.

Blanching also caused losses of activity of each of the enzymes studied, and the extent of inactivation increased with increased blanching time. Some loss of enzyme activity also occurred as a result of freezing, and in some cases during frozen storage. On the whole, the results of the study indicated no uniform relationship between enzyme activity and stability of ascorbic acid.

Digest from "Effect of Blanching and of Frozen Storage of Vegetables on Ascorbic Acid Retention and on the Concomitant Activity of Certain Enzymes," by E. R. Hartzler and N. B. Guerrant, *Food Research*, 15-23, Jan.-Feb. 1952.

BAKING

Gas In Bakery Doughs

Aeration is a general term meaning incorporation of air or CO_2 in a batter or dough to give it the desired porous structure when baked.

For production of gas reliance is placed on: (1) Fermentation, (2) beating or mechanical action, (3) chemical reaction, or, (4) injection of gas into the mix.

Fermentation usually means yeast action. Here gas production depends on the sugar present in the mix and can be controlled with a fair degree of certainty.

Gas retention depends on the physical state of the gluten and changes continuously during fermentation. There is an optimum state of gluten development which should coincide with a high level of gas production for the best crumb structure of the goods baked. Punching the dough breaks up the large gas bubbles and forms many small ones that can stand baking strains without coalescence.

Presence of air nuclei in a bread dough seems to be necessary for characteristic structure. Doughs made in a vacuum are extremely coarse. Sponge and other cakes aerated by beating have an optimum bubble size for best grain and normal baked volume. Measurements on aerated egg-sugar mixtures indicate that the optimum bubble size is about 40μ in

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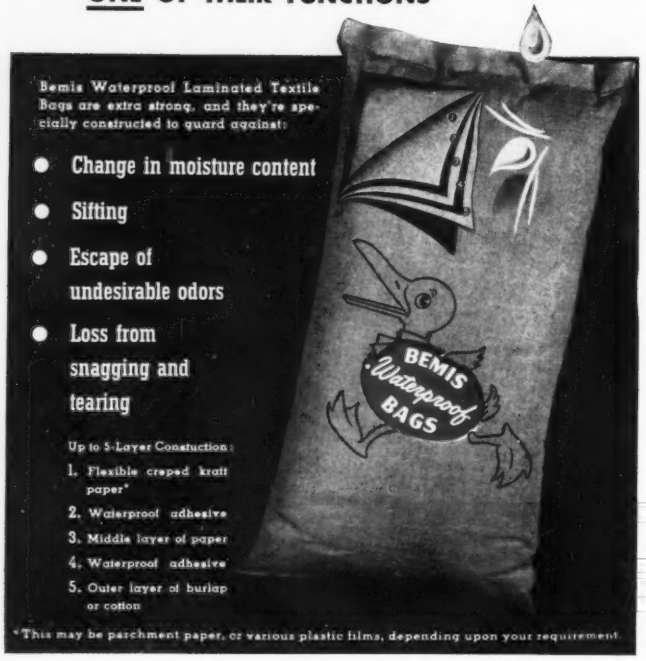
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dia. The number varies from 20-200 million per gram of mixture.

Degree of aeration is best measured by the "over-run" method, that is, the ratio of the loss in weight of a measured volume of batter after aeration to the aerated weight, times 100, equals percent overrun. While egg- and fat-sugar mixtures acrate differently, nothing seems to be gained by beating them separately as is sometimes practical; equally good aeration can be obtained by beating the mixture of fat, sugar, egg, and flour together.

Baking powder acrates a cake mix effectively but it is not always realized that the anions—tartrate or phosphate—can have somewhat differing effects on flour and thus affect the shape and size of baked pieces.

Hydrogen peroxide can be used successfully for aerating doughs since it yields only oxygen and water on decomposition, but it is an unsuitable material for bakery storage, being rather unstable. Acetone dicarboxylic acid which decomposes into CO_2 and acetone, both volatile during baking, has been suggested but is still of theoretical use only. "Aerated bread" in which CO_2 gas under pressure is injected into a yeastless dough during mixing is still made, but has never been a serious competitor of yeast-raised breads.

Digest from "Aeration of Bakery Products," by C. H. F. Fuller, *Chemistry and Industry*, 185-88, March 1, 1952.

CANNING

Checking Depth of Irradiation In Canned Food Products

Electronic sterilization of foods in packages depends on complete penetration of the food by the radiation. Therefore, some rapid means of testing the depth of penetration must be available, if this method of sterilization is to be useful.

Methylene blue, resazurin, and 2, 3, 5,-triphenyltetrazolium chloride are substances that undergo color changes when exposed to radiation. For example, resazurin changes from blue to pink to colorless. If a 14 mg. percent solution of the dye is made into a gel with 2 percent agar, cans filled with it can be exposed to radiation and the depth of penetration noted by observing the depth to which the gel is no longer colored. In flat sardine cans 16 mm. deep, the gel showed a pink color 6 mm. below the surface with 2-m.e.v. radiation and 9.8 mm. below with 3-m.e.v. rays. Therefore, such a can could not be sterilized by the former, even by simultaneous radiation from both

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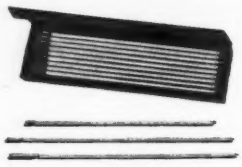

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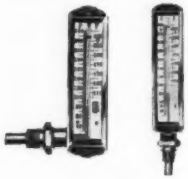

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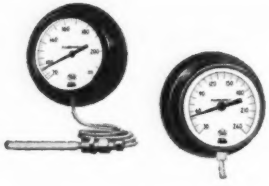

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9413

top and bottom, but would be sterilized by double exposure to 3-m.e.v. rays.

Methylene blue in aqueous solution is irreversibly decolorized by ionizing radiations, the amount of color destruction being a function of the cathode ray dosage in roentgen-equivalents-physical (r.e.p.). Vials of methylene blue can therefore be used for determining dosage of radiation for comparing effectiveness of different types of radiation, or for exploring the distribution of radiation strength in a beam or irradiated area.

Digest from "Evaluation of Food Irradiation Procedures. Quantitative Chemical Measurements Utilizing High Energy Cathode Rays," by S. A. Goldblith, B. E. Proctor, and O. A. Hammerle, *Industrial and Engineering Chemistry*, 310-14, Feb. 1952.

STORAGE

Storing Fresh Apples

Packing fresh apples between sheets of blotting paper impregnated with a salt-honey solution is a patented method for preserving the fruit in its natural state for as long as a year.

The treating solution is prepared by dissolving 2 gal. of table salt and 1-lb. of honey in 8 gal. of water, after which a sack containing 1-lb. of charcoal is suspended therein. Sheets of heavy white blotting paper, of a size to fit the standard apple packing box, are immersed in the solution for 48 hr., and then placed at the bottom and top of the pack. Additional sheets may be placed between each layer of apples.

Digest from U. S. Patent 2,576,919, issued Dec. 4, 1951, on an application dated Sept. 17, 1948, to Adam J. Borck, Canon City, Colo.

Grain Drying In Vacuum

Large-scale vacuum drying of grain is claimed to have advantages over conventional air drying methods because of more efficient use of heat, saving of space, greater precision of control, and less risk of damage to quality.

Within the range of 13-30 percent moisture (dry basis) the rate of drying of wheat in a vacuum is directly proportional to the free moisture content, meaning by "free moisture" the difference between total and firmly bound water in the grain. If moisture is on the surface or outer layers of the wheat berries, however, rate of loss is greater than when it is in the deeper layers of the individual grains.

Variations in degree of vacuum in the drying apparatus have a direct effect only on water that has left the

THESE White Tractors are ready to leave the modern Garland, Texas, plant of Kraft Food Company with a full payload of Kraft products. Kraft keeps Whites on the move . . . in all parts of the country.

READY FOR THE ROAD—

WITH MORE PAYLOAD

TODAY'S operating conditions call for more power . . . more payload . . . and White offers industry the most advanced engineering answer to these present-day transport problems.

Specifically designed for the particular set of operating conditions and legal restrictions it faces, each White adds new operating efficiency . . . extra payload advantage.

The new Whites with magnificent Mustang Power feature higher-than-ever power-to-weight ratio . . . substantial weight-savings . . . an amazing power reserve for hardest kind of road, load, traffic and scheduling conditions.

They're America's most popular . . most economical transport unit.

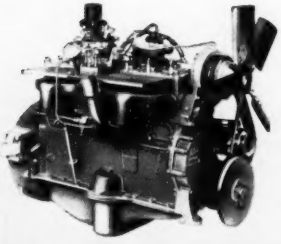
THE WHITE MOTOR COMPANY • CLEVELAND 1, OHIO

White

White EMERGENCY SERVICE CORPS

Keep Your Whites In Best Working Condition!

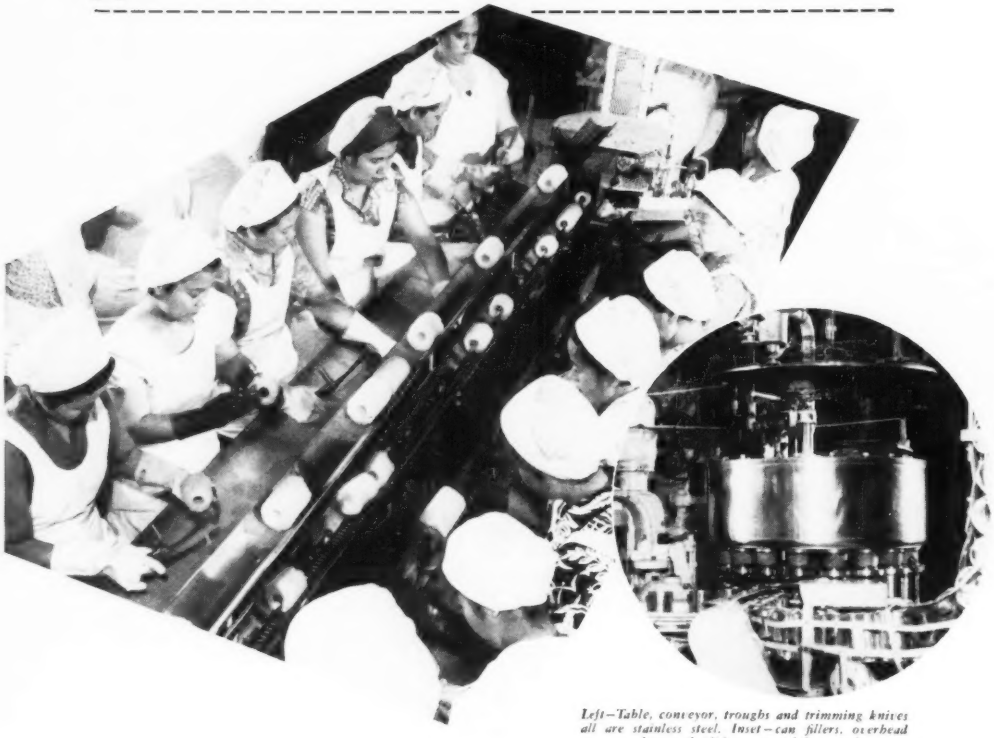
FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS



Magnificent Mustang Power

This great White Mustang Engine is a high-compression, high output, rugged engine that makes possible hauling maximum payloads within highway weight limits. It develops 150 H.P. ...6¾ lb./H.P. Designed for fuel economy and longer life of all wearing parts. More power per pound of engine weight.

World's largest cannery is ENDURO-EQUIPPED



Left—Table, conveyor, troughs and trimming knives all are stainless steel. Inset—can fillers, overhead valves and piping are stainless steel.

Since 1930, The Hawaiian Pineapple Company has been using more and more stainless steel equipment. Stainless steel—much of it Republic ENDURO—is highly important to the successful year-round operation of this "world's largest cannery."

ENDURO Stainless Steel thrives on fruits and fruit juices. It stubbornly resists rust, corrosion and the action of food acids. It does not contaminate metallically—can be trusted to preserve flavor at its freshest, color at its truest.

ENDURO is remarkably easy to clean and to keep clean—a simple warm water rinse and a wipe usually restores its glassy-smooth surface to sparkling cleanliness.

And, ENDURO lasts! In food process equipment, it seems virtually immune to wear. Solid stainless steel, it has no plating to chip or wear away . . . never requires refinishing.

File the name ENDURO with your plans for plant expansion and modernization. Republic metallurgists are ready to work with you, and with your equipment suppliers, on any development involving current or future use of stainless steels. Just write:

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic
REPUBLIC STEEL
ENDURO STAINLESS STEEL

Other Republic Products include Ex-L-ite Tin Plate, Pipe, Sheets, Bolts and Nuts, Electrunite Tubing, Niles Barrels and Drums

solids, though this also affects the rate of drying. A current of air through the mass improves the drying rate and makes higher pressure within the dryer almost as effective as a very low vacuum.

There is no indication that drying occurs in the interior of the grain. Instead, moisture must diffuse through the grain substance to the surface where it is evaporated. Impedance to diffusion of vapor in the small channels between individual grains can be substantially counteracted by an air current through the mass in equimolecular proportion to the water removed.

Digest from "Evaporation in Low Vacuum from Warm Granular Material (Wheat) During the Falling Rate Period", by C. R. Jones, *Journal of the Science of Food and Agriculture*, 565-71, Dec. 1951.

ENGINEERING

Centrifugally Actuated Valve Features New Emulsifier

According to a patented method and apparatus for making and breaking emulsions, hydrostatic pressure, due to centrifugal force of the mixture under treatment, automatically expands and contracts the discharge outlet of the machine and thus avoids clogging.

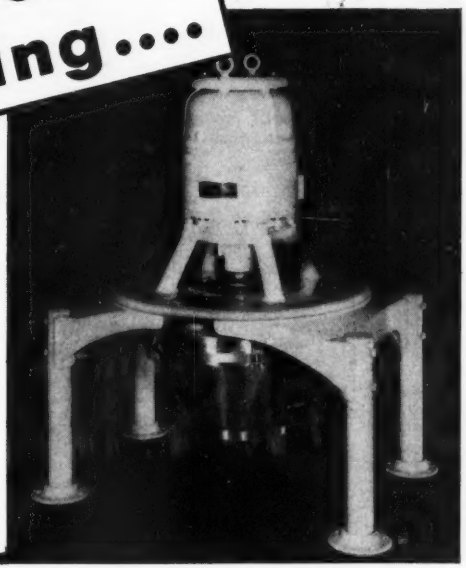
Invention resides in improvement of apparatus usually used in making emulsions in which a mixture of two or more materials is discharged between plates revolving at high speed and in close proximity to each other.

In operation of the improved apparatus, the mixture to be treated is fed into a locus of centrifugal force, or centrifugal chamber, where a body of the material collects adjacent to a restricted discharge outlet. This outlet is a narrow slit between two housing members forming the chamber, one of which is movable to expand and contract the outlet.

As the mixture accumulates in the chamber, centrifugal force causes it to exert increasing pressure on the movable housing member, thereby expanding the outlet to permit discharge of the mixture. This decreases pressure on movable member of the housing which contracts the outlet, whereupon another body of mixture accumulates in the chamber and the cycle is repeated.

This alternate expansion and contraction of the outlet may be accompanied by a pounding action on the discharging material, thereby tending to disintegrate particles of material between surfaces of the outlet. Preferably the movable housing member is arranged to expand and contract the discharge outlet rapidly.

Improved Mixing....



Self-Rising Flour
Prepared Cake Mixes
Enriched Flour
Ice Cream Mixes
Flavorings
Chemicals
Drugs

with "ENTOLETER" High Speed MIXER

HOMOGENEOUS MIXING is now obtainable for food products in faster time . . . at less cost . . . with the "ENTOLETER" Mixer. The "ENTOLETER" Mixer is a new-type centrifugal machine designed to provide thorough mixing and blending . . . in faster time . . . at reduced cost. The saving in mixing time is usually accompanied by a smoother, more intimate mix, permitting improvement in product quality. The high-speed centrifugal action thoroughly disperses materials, producing a remarkably smooth textured product. The Mixer is adaptable to continuous or batch processes.

The "ENTOLETER" Mixer requires only 12 cu. ft., with capacity of 12,000 lbs. of finished mix per hour. . . . where beetle or similar insect infestation may be present, this equipment destroys all stages of insect life. Mail coupon today.

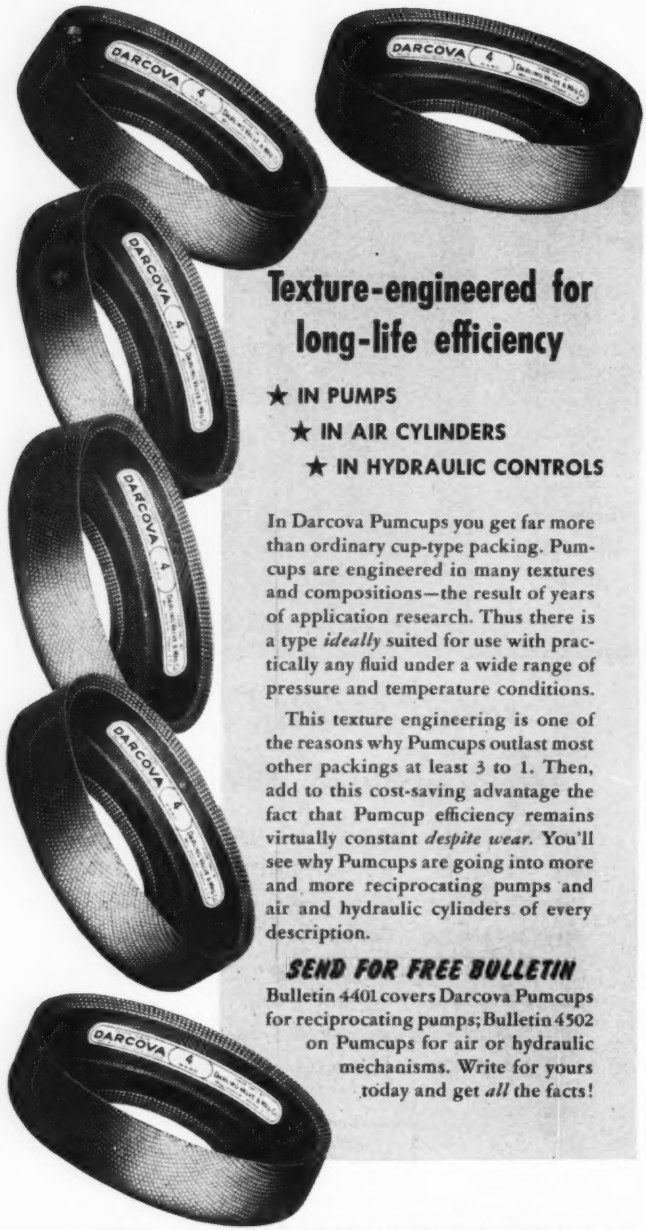
ENTOLETER DIVISION
The Safety Car Heating & Lighting Co., Inc.
P. O. Box 904, New Haven 4, Conn.

Please send bulletin describing the "ENTOLETER" High-Speed Mixer

Name .....
Company .....
Address .....
City, Zone and State .....

Foreign Distributors: Henry Simon Ltd., Stockport, England

For more information, use post card on last page.



Texture-engineered for long-life efficiency

★ IN PUMPS
★ IN AIR CYLINDERS
★ IN HYDRAULIC CONTROLS

In Darcova Pumcups you get far more than ordinary cup-type packing. Pumcups are engineered in many textures and compositions—the result of years of application research. Thus there is a type *ideally* suited for use with practically any fluid under a wide range of pressure and temperature conditions.

This texture engineering is one of the reasons why Pumcups outlast most other packings at least 3 to 1. Then, add to this cost-saving advantage the fact that Pumcup efficiency remains virtually constant *despite wear.* You'll see why Pumcups are going into more and more reciprocating pumps and air and hydraulic cylinders of every description.

SEND FOR FREE BULLETIN

Bulletin 4401 covers Darcova Pumcups for reciprocating pumps; Bulletin 4502 on Pumcups for air or hydraulic mechanisms. Write for yours today and get *all* the facts!

DARLING VALVE & MANUFACTURING CO.
Williamsport 20, Pa.

DARCOVA
THE ORIGINAL COMPOSITION CUP

PUMCUPS

Operation is fully automatic, the opening and closing of the discharge outlet and the resulting pounding action on the discharging material being controlled by changes in the centrifugal pressure of the mixture in the centrifugal chamber.

Digest from U. S. Patent 2,572,287, issued Oct. 23, 1951, on an application dated Aug. 28, 1946, to G. J. Strezynski, Chicago, Ill., assigned to De Laval Separator Co., New York, N. Y.

SANITATION

Quats Increase Effectiveness Of High-Pressure Cleaning

When high-pressure steam was tested for its cleaning and sanitizing value in dairy and food plants, it was found that it removed most of the test organisms from exposed surfaces by mechanical action, but that it was not necessarily lethal when applied for a short period. Addition of certain compounds to the steam, however, effectively killed all organisms.

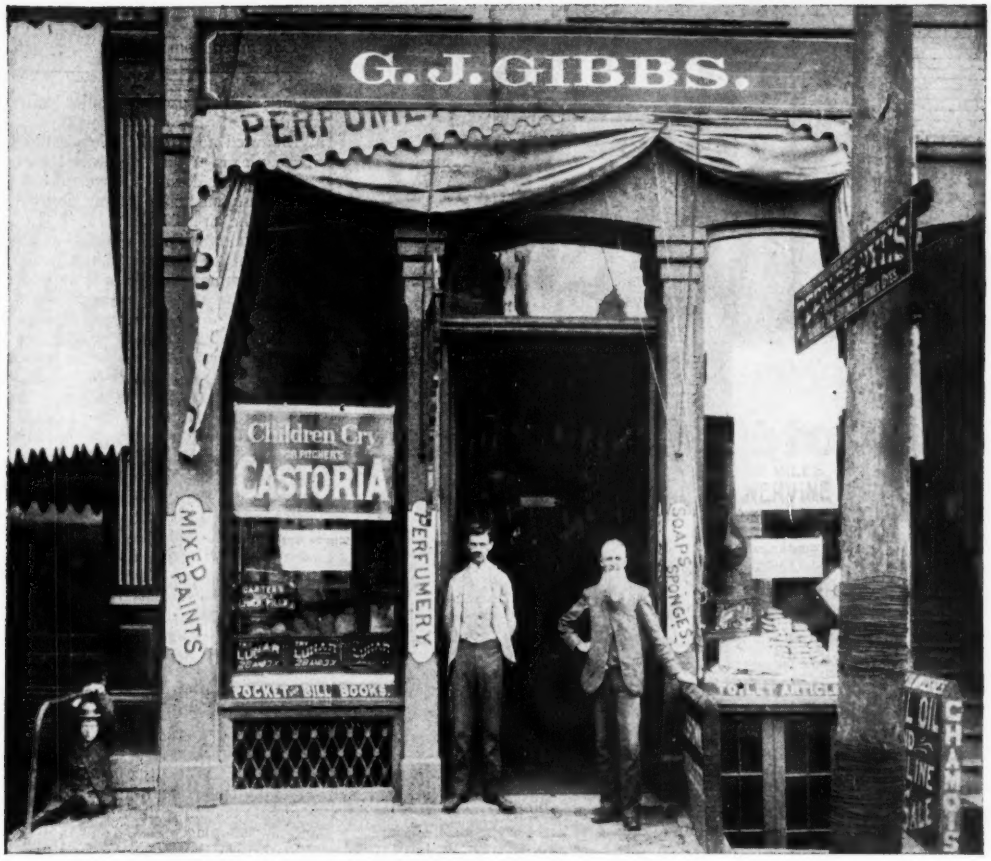
Test blocks of various materials were soiled with a coating of wheat flour, dried egg yolk, wall paper paste, evaporated milk, peanut butter, India ink, and water. These materials were thoroughly blended before adding the test organisms, and the soil was brushed on the test blocks in several successive layers. The blocks were then dried at 98 F. overnight before using.

Each block was divided into a test area and an untreated control area, and each was sampled. *B. subtilis* and *M. caseolyticus* were the test organisms. Steam, at a pressure of 90-120 psi. was directed at the test area for 10-15 sec.

Similar tests were made with alkali compounds and a quaternary ammonium salt added to the steam. The latter, alkyl dimethyl benzyl ammonium chloride, was selected because it would tend to have a residual effect on the treated surface.

The investigation showed that steam removed most of the test organisms by mechanical action. Some viable bacteria were found on the cleaned surfaces, and many such in the removed soil. Addition of alkali compounds to the steam augmented lethal action on the bacteria mechanically removed from the surface, but had little effect on the residual bacteria on the steamed surface. When a quaternary ammonium salt was used, no organisms could be found on the cleaned area.

Digest from "Studies on the Cleaning and Sanitizing Value of High Pressure Steam for Exposed Surfaces," by F. R. Peabody, W. L. Mallman, and R. J. Driesens, *Quarterly Bulletin*, Michigan Agricultural Experiment Station, Vol. 34, 22-29, Aug., 1951.



It has changed a lot inside, too!

The modern drugstore is a far cry from this old-timer—inside and out.

Good-by to ancient prescription jars and paper packages for powders. Today, as you know, thousands of drugs are packaged in modern, sanitary containers such as those shown below.

Many such containers have been pioneered by American Can Company since 1901.

Canco will continue to pioneer improvements for its customers in many businesses . . . in many fields.

CONTAINERS— to help people live better

AMERICAN CAN CO.

CANCO

NEW YORK
CHICAGO
SAN FRANCISCO
HAMILTON, CANADA

For more information, use post card on last page.

For LONG RANGE EFFICIENCY

insulate with Mundet Corkboard and Cork Pipe Covering...

Profitable production of frozen foods depends upon most efficient control of low temperature for freezers, hardening rooms, refrigerated storage and low temperature pipe lines. For long range economy and top efficiency, be sure you have MUNDET CORKBOARD for floors, walls, ceilings; MUNDET CORK PIPE COVERING for cold lines.

It pays to remember these benefits:

1. CORK IS MONEY-SAVING! Millions of dead-air cells in every square inch of Cork insulation cause it to serve as a most efficient *natural* barrier to heat flow. By its use, refrigeration is conserved to the most practical limits.

2. CORK IS LONG-LASTING! Cork has high structural strength and is a most durable material. It continues to serve for many years at highest efficiency.

3. THROUGH MORE THAN 80 YEARS AS CORK SPECIALISTS, we are able to preserve Corks' natural advantages in Mundet insulating products. Mundet engineers give you responsible assistance in building or expanding plant facilities. Let us help you secure low operating cost and maximum service.

Mundet Cork Corporation

Insulation Division, 7101 Tonnelle Ave., North Bergen, N. J.

Mundet district offices are located in these cities:

ATLANTA, 339-41 Elizabeth St., N.E. — DALLAS 1 ☐, 601 Second Ave. — JACKSONVILLE 6, FLA., 800 E. Bay St. — NEW ORLEANS 16, 315-25 N. Front St.
BALTIMORE 30, 612 Battery Ave. — DETROIT 21, 14401 Prairie Ave. — KANSAS CITY 7, MO., 1401 St. Louis Ave. — NEW YORK 17, 331 Madison Ave.
BOSTON, 57 Regent St., N. Cambridge 40 — HOUSTON 1, Commerce and Palmer Sts. — KNOXVILLE, 1221 Grand Ave. — PHILADELPHIA 39, 856 N. 48th St.
CHARLOTTE 3, N. C., 507 S. Cedar St. — INDIANAPOLIS 4, 15 E. Washington St. — LOS ANGELES (Haywood): 6116 Walker Ave. — ST. LOUIS 9, 3176 Brannon Ave.
CINCINNATI 2, 427 West 4th St. — In Canada: Mundet Cork & Insulation, Ltd., 35 Booth Ave., Toronto — SAN FRANCISCO 7, 440 Brannon St.

INSULATION FOR HIGH & LOW TEMPERATURE

Flash-Dried Starch

—*Continued from page 87*

veyor at any excessive inlet temperature.

Mounted next to the inlet-air thermocouple is a pressure-switch that will also shut down the dryer in case of exhaust fan failure or any obstruction in the air-flow path.

Also mounted on the panel is an instrument to protect against build-up of unburned gas. This is an electronic device that automatically shuts off the gas in case of flame failure, and it will subsequently relight the pilot flame and start the burner going after a fixed purging interval.

Operation of the latter unit is based on the principle that a flame will conduct electricity. A sensing electrode is mounted in the flame, and a circuit is made from this device through the flame and back to the instrument. If the circuit is broken due to flame failure, the magnetic safety shut-off valve is de-energized and an alarm sounds. If operating, the dryer feed conveyor will also shut down through a relay connected to the circuit.

Further on the purging interval prior to relight: This is automatic, delaying any attempted relighting for at least 60 sec. After that, 45 sec. are available for ignition attempts, and then if no flame is established the whole purge cycle is repeated. The pilot flame circuit includes a solenoid gas valve, an ignition transformer, and a spark plug.

Starting with the starch feed conveyor, almost all of the dryer system motors are interlocked in either one of two systems. The exception is the exhaust fan, whose failure is detected by the previously mentioned pressure switch in the riser duct.

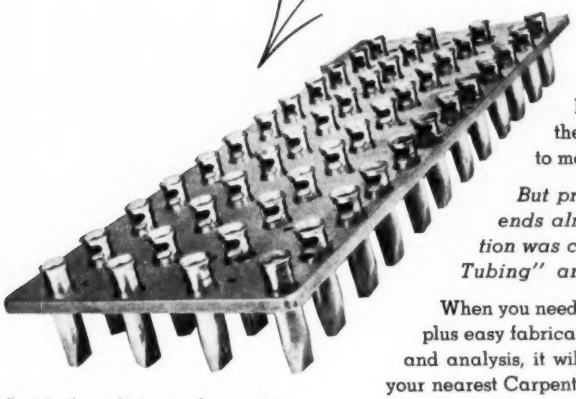
Additional panel components are four pressure indicators, which are connected to various parts of the dryer system. These measure the pressure drop across the wet scrubber, the suction pressures to the cage mill and exhaust fan, and the discharge pressure from the dryer cyclone.

Building Innovations, Too

The centrifugal-dryer machinery was set up in a new, three-story steel structure. Perlite panels were used to enclose the building—these panels being lifted for placement with a special hoisting rig using suction cups for simple and safe handling.

It is interesting to note that this is one of the first industrial buildings using these new wall panels. Precast in 20-ft. lengths, 16-in. wide, and 6-in.

FOOD PRODUCER DEVELOPS NEW PRODUCTION IDEA with *Carpenter* Stainless Tubing



Exactly the right temper for swaging and flaring, and a good, bright finish, were the bonus features this food processor got by specifying Carpenter Stainless Tubing, Type 304.

When this mass production assembly for holding "ice cream on sticks" was developed, the job called for "Type 304 Stainless Tubing" to meet sanitary requirements.

But problems in swaging and flaring the tube ends almost licked the idea. Then the specification was changed to "Carpenter *Type 304 Stainless Tubing" and fabricating problems disappeared.*

When you need the sanitary advantages of Stainless Tubing, plus easy fabrication because of uniformity in finish, tolerance and analysis, it will pay you to get in touch with Carpenter or your nearest Carpenter Stainless Tubing Distributor.

NEW SLIDE CHART ON BENDING STAINLESS TUBING

This new Carpenter service can help you conserve material, get best results with Stainless Tubing and Pipe. Covers bending radii, coil diameters for various sizes and gauges. A note on your company letterhead will bring you the new Carpenter Tubing Slide Chart.

THE CARPENTER STEEL COMPANY

Alloy Tube Division, Union, N. J.

Export Department: The Carpenter Steel Co., Reading, Pa. "CARSTEELCO"

Carpenter

more than corrosion resistance

STAINLESS TUBING

—guaranteed on every shipment

Stocked by Distributors in Most Major Cities

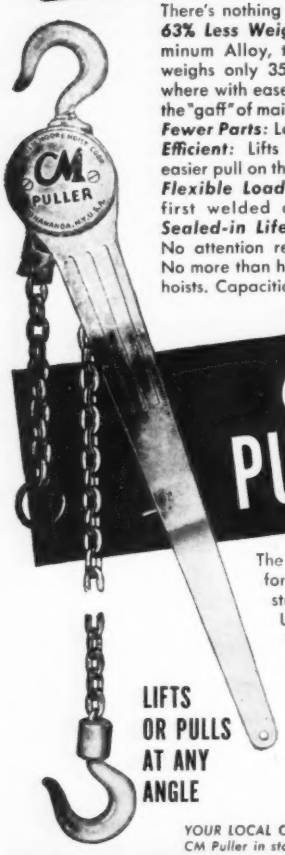
For more information, use post card on last page.

CM CYCLONE

LIGHT WEIGHT — HEAVY DUTY

High Speed CHAIN HOIST

There's nothing to compare with it! ***63% Less Weight:*** Of Alcoa Aluminum Alloy, the 1 ton capacity weighs only 35 lbs. Carry it anywhere with ease. Designed to stand the "gaff" of maintenance work. ***42% Fewer Parts:*** Long service life. ***96% Efficient:*** Lifts loads rapidly with easier pull on the chain. ***Herc-Alloy Flexible Load Chain:*** America's first welded alloy steel chain. ***Sealed-in Lifetime Lubrication:*** No attention required. ***Low Cost:*** No more than heavy old style chain hoists. Capacities: ¼ to 10 tons.



CM PULLER

The tool of a thousand uses for lifting, pulling, skidding, stretching, straightening. Use it vertically, horizontally, diagonally... any angle. Eliminates the dangers of makeshift methods. Holds the load where you leave it. Compact, light weight... the ¾ ton capacity model weighs only 13 pounds. Herc-Alloy flexible load chain. Labor saved more than repays initial low cost. Capacities: ¾, 1½, 3 and 6 tons.

LIFTS OR PULLS AT ANY ANGLE

YOUR LOCAL CM DISTRIBUTOR carries the CM Cyclone and the CM Puller in stock. Phone him for a demonstration in your plant.

CHISHOLM-MOORE

HOIST CORPORATION

(Affiliated with Columbus McKinnon Chain Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES: New York, Chicago and Cleveland • Distributors Everywhere

thick, they have the appearance of concrete but are composed of the insulating aggregate, Perlite (made by expanding volcanic glass) combined with portland cement and reinforced with welded steel mesh. The 6-in. thick sections are estimated to have the insulating properties of a 15-in. brick wall.

End (*Resume reading on page 88*)

Fully Conditioned Plant

—*Continued from page 92*

ing is provided for each of the three storage rooms in the basement of the building. For here 100-, 115-, and 120-deg. F. are required, respectively, to keep fluid such items as syrups, lard, and other ingredients, so that they can be pumped through piping to the various manufacturing areas. One space heater, operating on 100 percent recirculated air, maintains the desired temperature for the ingredients being stored in each room.

For drying starch trays, there are three rooms on the second floor kept at 140 deg. F. by individual heaters, each having a capacity of 400,000 Btu. per hr. Air is discharged into the rooms at high velocity through duct openings at floor level. A return air duct to the heaters runs overhead on the centerline of each room.

Another large basement storage room is kept at 60 deg. F. by four air-cooling units discharging via aluminum ductwork. Cellophane storage, occupying about 2,800 sq. ft., is constantly kept at 70 deg. F. with 35 percent RH. by two ceiling-mounted air-cooling units equipped with steam reheaters to control the humidity. Here, refrigerant is supplied by a separate direct-expansion unit with 7½-hp. motor.

Lower Maintenance Costs

There were several additional economical advantages in using direct-fired space heaters. The problem of carrying a large stock of replacement spare parts for them was simplified, since all are of the same design. Thus, maintenance expense was reduced. Space heaters also give the added benefit of a de-centralized heating system, which reduces the risk of a major breakdown.

Maintenance of this type of heating system is confined to a limited area, thus assuring continuous plant production. Still another advantage in this plant is that seasonal manufacturing temperatures can be assured by using only a selected number of the heaters

(*Turn to page 204*)

Quality in Quantity

● *Gas-fired Baker Perkins oven bakes 7,200 loaves of bread per hour at Omar Incorporated, Columbus, Ohio.*

● *720 dozen doughnuts an hour are formed, proofed, fried, glazed and cooled in this Gas-fired machine, manufactured by the Doughnut Corporation of America, New York.*

- **BREAD AND ROLLS**
- **PIES**
- **DOUGHNUTS**
- **CAKES**

from GAS Baking Equipment at Omar Incorporated

QUALITY in QUANTITY GAS BAKING is typical of the Columbus, Ohio, bakery of Omar Incorporated, Omaha, Nebraska. The continuous, automatic production-line methods of Omar highlight the versatility and effectiveness of GAS baking for speed and quality.

Modern Gas Baking and Frying Equipment helps produce

- **7,200 loaves of bread per hour**
- **720 dozen doughnuts per hour**
- **500 eight inch pies per hour**
- **2,340 layer cakes and 10,000 cupcakes per hour**
- **plus large quantities of sweet and plain rolls.**

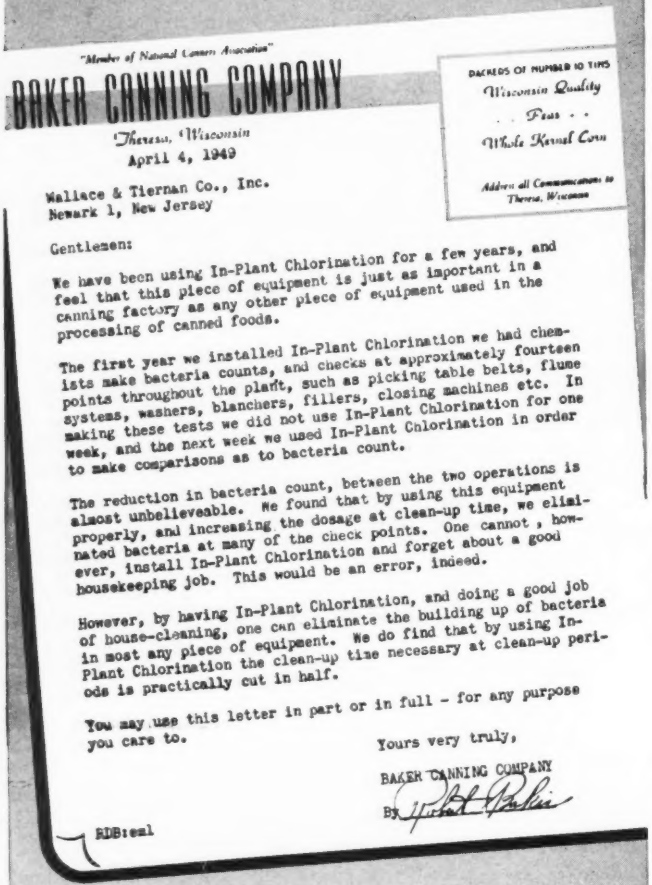
Baking temperatures obtained with GAS are precise and easily controlled. Gas is clean, economical, and completely adaptable to all baking requirements.

Whether your baking volume is large or small, Gas baking gives the speed and precise temperature control needed to make your bakery goods the best possible, as at Omar. Get the facts today from your Gas Company Representative.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

MORE AND MORE... THE TREND IS TO GAS FOR ALL COMMERCIAL COOKING

Here's what IN-PLANT CHLORINATION can do



"Member of National Canners Association"

BAKER CANNING COMPANY

Theresa, Wisconsin

April 4, 1949

PACKERS OF MUMBLE SO TIPS
Wisconsin Quality
Peas
Whole Kernel Corn
Address all Communications to Theresa, Wisconsin

Wallace & Tiernan Co., Inc.
Newark 1, New Jersey

Gentlemen:

We have been using In-Plant Chlorination for a few years, and feel that this piece of equipment is just as important in a canning factory as any other piece of equipment used in the processing of canned foods.

The first year we installed In-Plant Chlorination we had chemists make bacteria counts, and checks at approximately fourteen points throughout the plant, such as picking table belts, flume systems, washers, blanchers, fillers, closing machines etc. In making these tests we did not use In-Plant Chlorination for one week, and the next week we used In-Plant Chlorination in order to make comparisons as to bacteria count.

The reduction in bacteria count, between the two operations is almost unbelieveable. We found that by using this equipment properly, and increasing the dosage at clean-up time, we eliminated bacteria at many of the check points. One cannot, however, install In-Plant Chlorination and forget about a good housekeeping job. This would be an error, indeed.

However, by having In-Plant Chlorination, and doing a good job of house-cleaning, one can eliminate the building up of bacteria in most any piece of equipment. We do find that by using In-Plant Chlorination the clean-up time necessary at clean-up periods is practically cut in half.

You may use this letter in part or in full - for any purpose you care to.

Yours very truly,

BAKER CANNING COMPANY

By Robert Baker

RLB:eal

In-Plant Chlorination, engineered by Wallace & Tiernan, can help your plant, too. Bacterial counts are reduced, odors controlled, and on-the-line time for processing equipment increased when you use this proven method.

Call your nearest W & T Representative now for complete information.

Other services by Wallace & Tiernan Associated Companies include Merchen Feeders for precision blending BY WEIGHT; Richmond Sifters for all separating problems involving powdered or ground materials; and Richmond Permaflux Magnets for the complete elimination of any ferro-metallic contamination of your food line.

WALLACE & TIERNAN COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1 NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

I-33

Pinning Freezing Costs

—*Continued from page 71*

Equipment in the compressor room comprises: Eight Worthington vertical ammonia compressors (three 9 x 9, one 8 x 8, four 7 x 7); three 6-cylinder 6-in. reciprocating compressors, one 14 x 11 in. vertical booster compressor, and one rotary booster.

Normally, the two-cylinder compressors operate at the higher temperatures for serving the storage rooms and for precooling. They also act as the second stage for the three 6HA6 ammonia boosters, the horizontal ammonia booster compressor, and one Fuller Rotary. The five booster compressors normally are connected directly to the freezing tunnels.

All of the vertical two-cylinder compressors are manifolded and valved to allow any one of them to act as a single stage compressor for the storage rooms or as a high stage compressor for the freezing tunnels. The six-cylinder 6-in. vertical booster compressors are also manifolded in order that they may be used in any combination to suit the load demanded. The same is true for the 14 x 11 horizontal booster.

Each booster has its own individual suction trap and desuperheater, also its own automatic oil separator in addition to discharge-line oil traps.

One Held as Standby

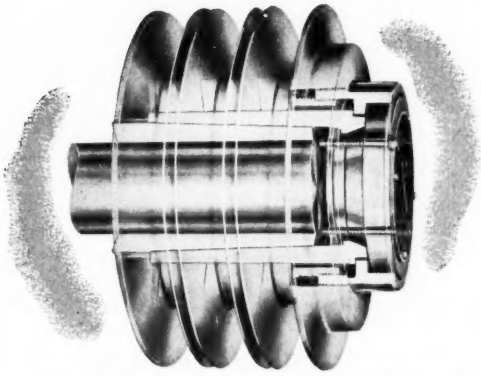
There are enough compressors to hold one as a stand-by for high stage operation and for booster operation. With a simple manipulation of valves, any compressor, or combination of compressors, can be removed from the line and the stand-by put on in a matter of minutes.

Due to the complete valving arrangements, any compressor, or any combination of compressors, can be placed on any load in the plant. In case of a major breakdown, enough repair parts are carried to completely rebuild any one of the various type compressors in a matter of hours.

The condenser rack contains a battery of eight shell and tube units. Neatness in piping and arrangement conforms with that of the entire refrigeration system. In the summer rainy season, well water at 78 deg. F. is used for condensing. However, during the winter these wells become too salty, since the plant is located within a few blocks of the Gulf of Mexico. Stainless steel tubes have been installed recently in all condensers because of excessive rusting of the original tubes.

In line with the general thoughts of

Let's get our heads together about speed control — and PROFIT!



American Adjustable-Speed Drives are available in A, B, C, Q, and R Section Grooves.

When the competition is tough—there's a lot of profit in that final extra production from every machine in a shop. And that extra production—that touch of gold—is what we'd like to talk over with you.

The American Adjustable-Speed line can add that touch of gold to your production . . . quickly, easily, inexpensively. YOU GET:

• Precision Speed Control • High Production at minimum capital and maintenance cost • Better quality control • Flexibility to meet variations in rated motor speeds or calculated speeds of belt drives

American's exclusive double-taper hub construction maintains speeds at your selected setting and long life of sheave and belts. Sleeves expand to lock flanges in position and the sheave to the shaft during operation . . . there's no chance for wear. Installation or removal is no problem . . . tapered bushings make American Adjustable-Speed Sheaves easy on and easy off the shaft.

Get the profit story of the American Adjustable-Speed line and see how it can help you to more profit. You're not obligated when you clip and mail the coupon today.

Other Products

Speed Reducers and Overload Releases

Econ-O-Matic Motor Bases

Multiple-Groove Wedg-Tite Sheaves

Wedgbelts

Steel Split Pulleys

Hi-Torque Motor Pulleys

Conveyor Pulleys

Backstops

At the profit end of the machine

Power Transmission by

AMERICAN

PULLEY COMPANY

THE AMERICAN PULLEY COMPANY
4206 Wissahickon Ave., Philadelphia 29, Pa.

Gentlemen:

Please rush me your bulletin on the American Adjustable-Speed line.

Name _____

Address _____

City _____ *Zone* _____ *State* _____

LOW COST HIGH EFFICIENCY REFRIGERATION

is something BRUNNER can prove!

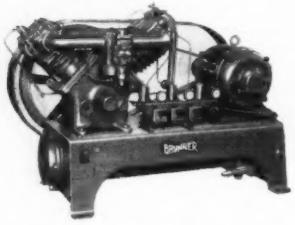
Processing, storage, transportation, retailing, wherever refrigeration is used in the food industry, Brunner units are at work—economically, efficiently and dependably doing the jobs assigned them.

Starting with the A-18 air cooled, ¼ horsepower compressor to the W-75000, eight cylinder 75 ton capacity condensing unit, Brunner makes available 69 open type models—each of them offering one or more specific refrigeration or air conditioning application advantages.

BRUNNER SINCE 1906

REFRIGERATION

The Brunner Catalog fully describes these units. We invite your request for a copy.



MODEL W-10000 four cylinder Water Cooled Condensing Unit. Equipped with Brunner automatic capacity control, 4 steps of capacity are possible. Accurate control of desired temperature is held with less frequent cycling, lower power consumption.

Get acquainted now with the refrigeration and air conditioning planning, installation and service facilities offered by your local Brunner representative. His abilities are further supported by a factory application-engineering staff, and experience files gathered from every segment of the food industries. Low cost, high efficiency refrigeration is something Brunner can prove. Write us.

BRUNNER MANUFACTURING COMPANY, UTICA 1, N. Y., U. S. A.

BRUNNER SINCE 1906

AIR CONDITIONING Self Contained Units to 10 hp. Condensing Units for Remote Installation to 75 hp.

AIR COMPRESSORS Single Stage ¼ hp. to 2 hp. Two stage 1½ hp. to 15 hp. Horizontal and Vertical Models.

preventive maintenance, which is paramount in the policy of the company, a spray pond has been located on the roof of the main plant utilizing city water of low salt content to provide cooling to the heads of the ammonia compressors, thus eliminating excessive rusting of these heads. This spray pond also furnishes condenser cooling water in cool weather.

All liquid feed lines, feed valves, and also the condenser have been sized ample enough to supply liquid to the evaporators at a very low head pressure, which means that hp. per ton runs very low. Also, the condensing pressure is so low that as a rule no desuperheating of the discharge from the booster compressors is required, although this provision is made when head pressures do rise.

The condenser bank is also valved so that any one condenser may be easily taken out for service, still providing enough capacity for the plant to continue operation with a normal head pressure.

Oil Reclaimed

There is an oil reclaiming device, located in the compressor room, which connects to the oil drain valves of all evaporators. The oil may be drained while a unit is in operation.

Also unique at this plant are the liquid ammonia traps provided to quickly empty the booster compresser suction line in case of a severe floodback due to trouble with any one of the liquid feed controls. Many of the traps and separators were built on the job in this plant's shop.

End (Resume reading on page 72)

Bottle Handlers

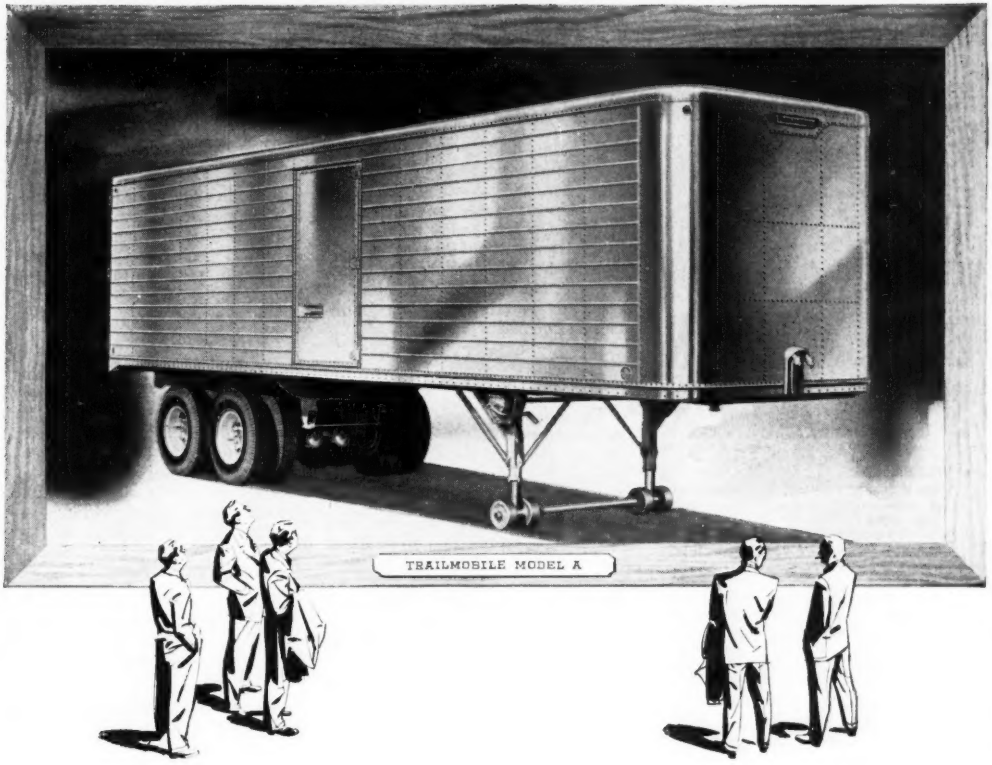
—Continued from page 127

lel conveyor chains, on which they move to a stop.

At this point there is an opening in the guide rails wide enough for 6 bottles—2 rows of 3 bottles. The operator fastens the gripper onto the 6-bottle unit (see accompanying drawing), then slides it toward his body and lowers it into an empty case resting on the case conveyor below. Two such trips and a case is filled.

Two types of installations are supplied: (1) The seated, (2) the standing. In the former (illustrated here), the operator sits on a comfortable seat immediately above the line of cases and faces the double line of bottles. His feet are on special rests, in one of which is incorporated a tripping de-

(Turn to page 184)



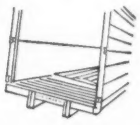
A *Sound* idea for moving more food at lower cost!

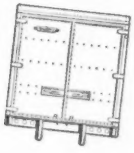
Every day more and more Trailmobiles are being used to haul America's food . . . from farm, to factory, to store. And every day food men discover more reasons why it *costs less* to move food products in lightweight, aluminum Model "A" Trailmobiles. Stripped of revenue-stealing dead weight, they are easier to pull, easier to maintain. New design features increase payload by as much as 15%! This model is also available as a refrigerated unit. Get all the facts about these new, money-making aluminum trailers by writing on your company letterhead—*today.*

TRAILMOBILE FEATURES FOOD MEN LIKE!

New squared front design. Short radius corners provide extra payload space at the front end. Full 90" inside width increases payload as much as 15%.

Floors take heavy lift-trucks. Edge grain fir floors have bolsters on 12" centers to handle lift trucks with axle loads as high as 10,500 pounds.





Improved weather-proof doors. Recessed, pressure-type door latches seal out dirt and water. Individual locks permit the opening of one door at a time.

The Trend is to TRAILMOBILE

TRAILMOBILE INC.
Subsidiary of Pullman Incorporated
Cincinnati 9, Ohio • Berkeley 10, California
Friendly Sales and Service from Coast to Coast

There's one ideal Belt for the FOOD industry . . . .

BALDWIN SUPERTEX

Reg. U.S. Pat. Off.

- **WASHABLE**
  Easily cleaned with soap and water, steam or concentrated cleaners—no removing from pulley.
- **WATERPROOF**
  Minimum shrinkage even when run under water. Neoprene covers all fibers.
- **TASTELESS**
  Food products can be carried directly on the belt — meats, biscuits, candy, raw vegetables. No taste!
- **NON-TOXIC, ODORLESS**
  Safe. Guaranteed to meet all sanitary and health requirements of the food industry.
- **RESISTS HEAT**
  Can be used where heat is up to 250 degrees F. Frequently carries baked goods direct from oven.
- **STRETCHES LESS**
  Multiple plies of light weight CLOSE WOVEN duck stretch less. This means fewer troubles with loose metal fasteners.
- **LEAVES NO IMPRESSSION**
  On products even soft candies. Perfectly SMOOTH top cover. Calendered and press-cured same as heaviest conveyor belt.
- **HAS BONDED EDGES**
  Developed by our engineers. Prevents fraying (cause of much premature belt failure).
- **RUN OVER SMALL PULLEYS**
  Full width fabric. No folds. No splices. Remarkable flexibility built into SUPERTEX.
- **ENDLESS WITHOUT SEWING**
  Can be made so, either at our plant or in the field. Multiple step-lap outlasts belt itself.
- **ACID-ALKALI RESISTANT**
  Ideal for use not only in food industry but many other types of industrial operations.

Send for CATALOG and get all facts, technical data & suggested uses.

Also get the facts on TREAD-TOP, the non skid belt with a top that grips like the tread on a tire for conveying articles and packages up inclines to 30 degrees. Its rich brown color and washability makes it ideal for food and other plants requiring a sanitary belt.

BALDWIN BELTING INC.

76 Murray St. New York 7, N. Y.

Questions & Answers

THIS MONTH'S PROBLEM

Question — Our Concord-grape process involves chuting bunches of grapes into a stemmer, which separates pulp from stems, and then packing the pulp into barrels for freezing. However, we would like to go one step further and remove the seeds from this homogeneous mass of skins, flesh, and juice. Would you kindly advise a method?

Answer to April Problem

The Question Was—We seek to manufacture a soft ice cream, but are not clear on the steps. Would you please supply us with a formula and notes on the processing phases?

Answer—Assuming that you aim for an ice cream product with a butterfat content somewhere between a sherbet and ice cream to be sold directly from the freezer, then here are two 6-percent fat formulas:

Formula 1—40-percent cream, 15 lb.; 32-percent concentrated skim, 9 lb.; skim milk, 60½ lb.; cane or beet sugar, 7½ lb.; dextrose, 7½ lb.; and stabilizer and emulsifier, ½ lb.

This product would contain approximately 9 percent milk-solids-not-fat, and when drawn from the freezer at a 40-percent overrun it will give an excellent soft cream.

Formula 2—40-percent cream, 15 lb.; 32-percent concentrated skim, 29 lb.; skim milk, 39½ lb.; cane or beet sugar, 10 lb.; dextrose, 6 lb.; and stabilizer and emulsifier, ½ lb.

Here, there would be about 13½ percent milk-solids-not-fat and, therefore, the ice cream may be drawn from the freezer at a much higher overrun than in the case of Formula 1.

Mixes should be pasteurized at 160 deg. F. for 30 min., then homogenized in two stages, using 2,000 and 500 lb. of pressure, next cooled below 40 deg. F., and finally held 24 hr. before freezing.

Trouble With Paint Odors

Question—We have run into an exasperating problem—lingering, objectionable solvent odors after completing a re-painting job in our plant. Not only do our employees complain of these odors but also of smarting eyes. Advice on how to minimize this trouble would be appreciated.

Answer—Today, many paints contain organic solvents such as varnolene and synthetic naptha instead of distilled turpentine. These are the kind of solvents that cause odors and smarting of the eyes.

It is, however, possible to reduce to a practical minimum the objectionable odors in the primer and the secondary or final coating by using small amounts of pure vanilla extract—odd though it may seem.

When mixing the primer and the final paint coating, put 1 fl. oz. of extract in 1-gal. paint. Addition of the extract will not affect the paint color.

After applying the primer, you will find very little, if any, of this solvent trouble in the area painted. The same will be noted after the secondary coat.

Believe it or not, this simple technic really works—curbs those lingering odors and the eye-smarting.

Frozen Custard Formula

Question—We would like to have complete information on manufacturing a frozen-custard mix containing 12 percent of fat and 10 percent of serum solids.

Answer—For the mix you are seeking use: Milk (4 percent fat), 35.7 lb.; cream (40 percent fat), 26.5 lb.; condensed skim milk (3-to-1 ratio), 21 lb.; sugar, 15 lb.; dried egg yolks, 1.5 lb.; and stabilizer, 0.3 lb.

Processing details are simple: The custard mix should be pasteurized at 150-160 deg. F. for 30 min., homogenized under 1,500-3,000 psi., and cooled below 50 deg. F. prior to freezing. This information is taken from the Bureau of Dairy Industry, USDA.

How Would You Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is Your Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

CUT DOWN ON BREAKAGE

...with tailor-made Riegel papers

A few things RIEGEL can do for you . . .

- Keep products dry
- Keep products moist
- Retard rancidity
- Seal with heat or glue
- Provide wet strength
- Stop grease penetration
- Retain aromas, flavors
- Resist extreme cold
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LINERS of corrugated glassine or greaseproof are widely used to reduce breakage . . . and at the same time provide grease resistance or other functional properties. Reducing breakage is a problem Riegel has helped to solve for products that range from candy and cookies to aeroplane parts. For *your* products, we may already have just the right paper . . . or perhaps we can find a better answer in something entirely new. Whatever the problem, we can usually meet your requirements . . . quickly, efficiently, economically. Just tell us what you want paper to do for *you*. Write to *Riegel Paper Corporation, P. O. Box 170, Grand Central Station, New York 17, N. Y.*

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Continuous Drying

OF FOOD MATERIALS
IN A PACKAGED UNIT--

RAPIDLY-UNIFORMLY
ECONOMICALLY!

The
PATTERSON
Packaged Drying Unit

This complete rotary drying unit is assembled on a single base for easy and low-cost installation. Uniform drying of food materials is provided, with continuous feed direct to the sanitary interior of the unit, and continuous discharge of the dried, uncontaminated product.

Positive, automatic control of drying temperatures is maintained, and variable feed rate provided for different material drying characteristics. Built in sizes from 2' x 10' to 3' x 24', units are available in plain or stainless steel, or pure white POROX lining. Write!

Richard L. Carson
President

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The Patterson Foundry and Machine Company, (Canada) Limited
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MONTREAL

Automatic Blending of Syrups

Question—In our canning of fruits, we contemplate going into a system of liquid sugar and corn syrup blending for making up our filler syrup. We understand that there are various ways of making this blending operation almost completely automatic, and we would appreciate your views.

Answer—A great deal of development work in automatic syrup blending has been done the past few years in the canning industry. However, there are still very few pushbutton systems that will allow a canner to set any desired Brix and ingredient proportion at a panel and then have automatic functioning to supply a steady flow of the desired syrup to the fillers.

Suppliers of liquid sugar and corn syrup have, however, been working on this problem, and we'd suggest that you consult them before fixing your plans.

There are three possible ways to accomplish the desired automatic proportioning of syrups: (1) Sequenced batch metering, (2) proportioned flow, and (3) density control.

Batch-metering is, by far, the most widely employed method. It involves use of indicating "mutating disk" flow meters that can be set to close a valve in the syrup line at any preset value. These meters then deliver the desired proportions, and the syrup can be made up in a mixing tank for piping directly to the filler floor.

Proportioned-flow control of syrups effects the same end as batch-metering. However, it puts the operation on a continuous basis and removes some of the calculations necessary in making up a batch.

Essentially, this system consists of flow meters, in both liquid lines, which actuate a master instrument having the desired proportion pre-set as a control valve. This instrument will then regulate a valve on the line with lesser flow to proportion exactly this liquid with another.

While the continuous proportioning system is more automatic than batch-metering, it has had very little application and involves more delicate instruments. Furthermore, both of these metering systems presuppose that the supply of liquid sugar and corn syrup is fixed at a very definite Brix or Baume. If this factor is variable in the product for blending, then the proportioned flow control can be way off.

A third approach—one already successfully tried in the automatic blending of liquid sugar with water to a fixed Brix—involves a continuous density measurement and control. Employed is either a product-sampling

What do you do when you don't have the right size v-belt in stock?

1

Contact your supplier for a replacement

...and wait for delivery
...wait—and watch production stay at zero

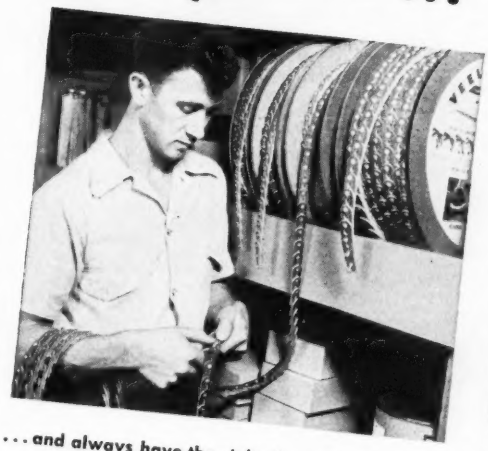
2

Send someone to get the required belt

...and pay your employee while he goes for the belt
...pay through loss of production

3

Stock VEELOS...



...and always have the *right size* belt when you need it
...any length can be made up from a 100-foot reel
...inventory is automatically maintained
...available from 350 distributors

GET ALL THE FACTS

This Veelos Data Book gives complete details about construction, installation and uses. Write for free copy of this money-saving book today.

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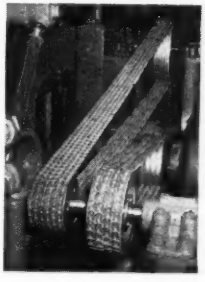
VEELOS in stock is Production Insurance

Belts for replacement always on hand—just 4 reels of Veelos in the 0, A, B and C widths can replace up to 316 different sizes of endless v-belts.

Link construction permits quick installation—without removing outboard bearings.

Adjustability provides controlled tension on each belt—vibrationless, full power delivery is assured.



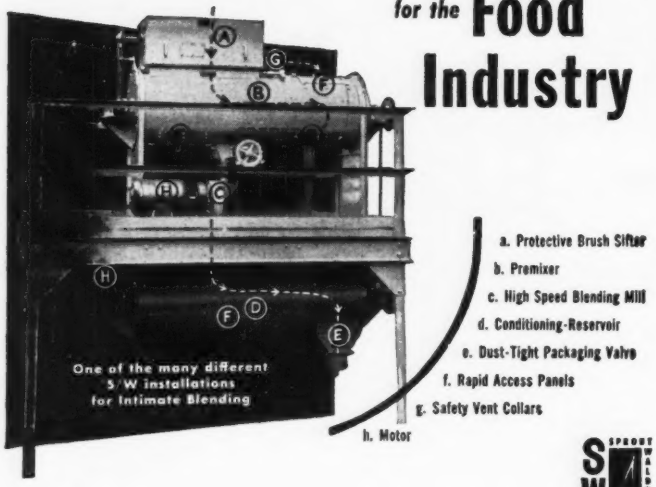
ADJUSTABLE TO ANY LENGTH · ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in 0, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

LOOK WHAT'S NEW IN

intimate blending

Now... A Step Beyond Mixing for the Food Industry


One of the many different S/W installations for Intimate Blending
a. Protective Brush Sifter
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c. High Speed Blending Mill
d. Conditioning-Reservoir
e. Dust-Tight Packaging Valve
f. Rapid Access Panels
g. Safety Vent Collars
h. Motor

When specifications call for powder blends of high uniformity, Sprout-Waldron's *Intimate Blending Systems* provide the perfect solution. Engineered to individual needs, these versatile systems are indicated wherever powders 100 mesh or finer are to be blended to smooth-flowing, lump-free uniformity — especially formulas including liquids or fibers as well. Ruggedly constructed, the compact assemblies operate on the gravity flow principle and take up a minimum of floor space. They are misers on power consumption, too — are quiet, smooth-running, and clean. Dust-free operation is another vitally important S/W feature. Easy accessibility and simplicity of interior for cleaning, etc., assure advantages which have been developed through long practical experience. The minimum of moving parts means additional economies in maintenance. Sprout-Waldron specialists have successfully solved intimate blending problems in a great many widely different food processing plants from coast to coast. Their expert advice is yours for the asking. It may help step up production, improve your product and working conditions in the plant, and increase profits. Write for Bulletin I-846 today! Address Sprout, Waldron & Co., Inc., 35 Logan Street, Muncy, Penna.

Sprout-Waldron
Manufacturing Engineers
MUNCY • PENNSYLVANIA

134-A

bubbler tank or an "in-line" displacer-type measuring system. The latter is deemed more suitable because of its faster measuring action in continuous blending.

Theoretically, automatic control of the blending operation by density would be the ideal and most accurate way to do the job. Density controllers on both liquid lines could be used to either stabilize the supply-product densities or to reset the master blend-density controller. The latter instrument would control the addition of the lesser syrup flow to the uncontrolled liquid. Its control setting would be a desired blended-syrup density, which would be the result of cutting back or enforcing the density of one syrup with another.

While density control of syrup blending would undoubtedly be simplest for completely automatic operation, the present inexperience of industry with such equipment does not suggest that a ready-made system could be set up today to promptly do the job.

Perhaps the answer, at the moment, is a system combining well-proven density control on the supply syrups with a proportional flow control of the actual blending operation.

In any event, careful engineering and appraisal of your requirements must be made by your own staff, suppliers of syrups and, perhaps, a reputable industrial instrument company before a fully automatic system could be ventured.

Anent New Cheese Bandage

Question—I'm told a new plastic cheese bandage has been developed to be used in conjunction with a wax to make a coating. Can you give me further information?

Answer—Yes, a non-woven rayon, plastic-coated bandage has been introduced for employment with a flexible wax for protection of rindless block cheese.

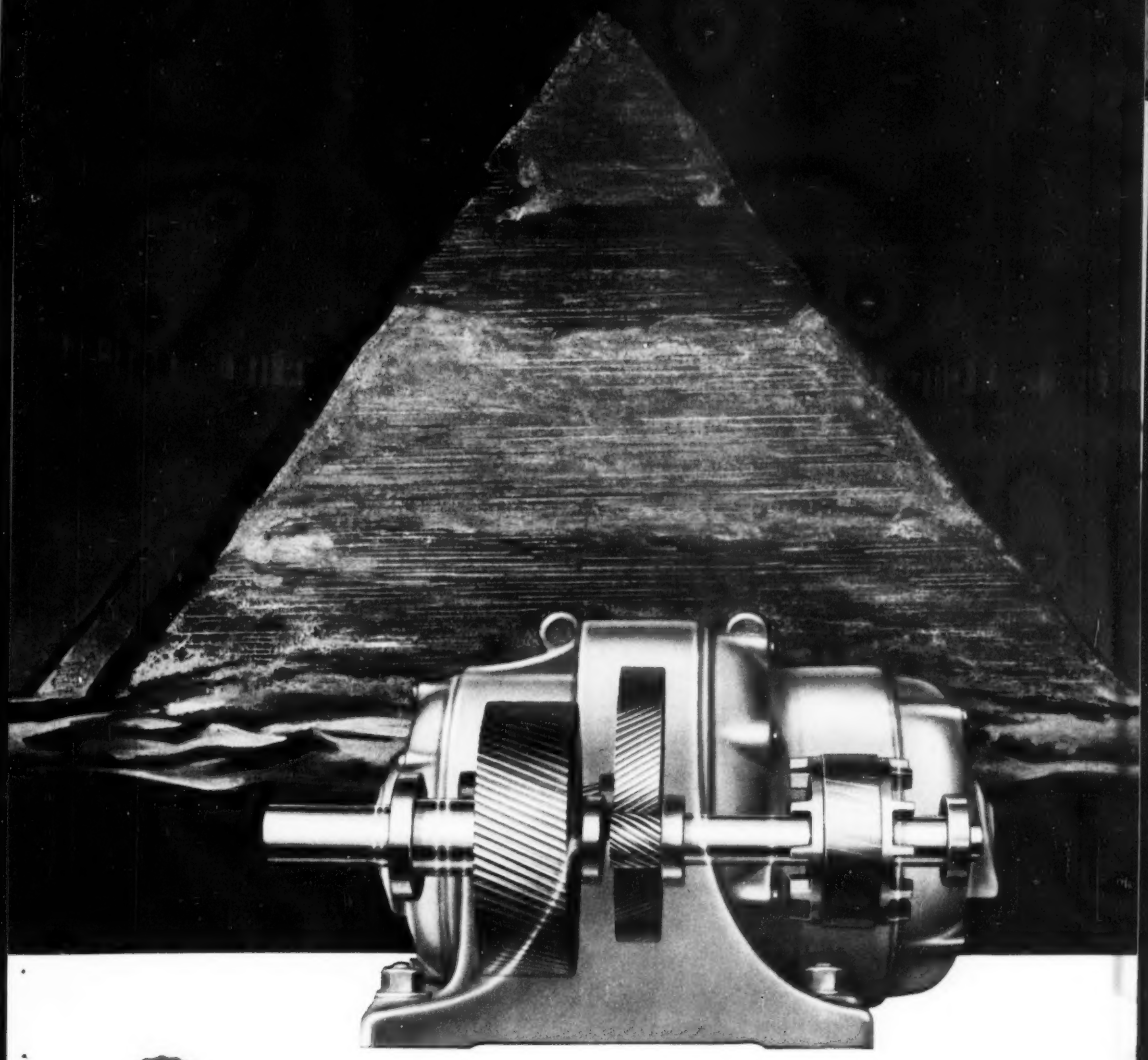
The new bandage is wrapped around cheese leaving the press. After this bandaged cheese is dried for about 24 hr., it is then coated with a hot flexible wax which sets upon cooling.

Drying enables the hot wax to penetrate through the bandage without the formation of a rind. In turn, the rayon bandage reinforces the wax film to prevent the coating from cracking. And the wax also assures an air-tight seal.

Both bandage and wax can be readily stripped from the cheese by the consumer.

(Turn to page 180)

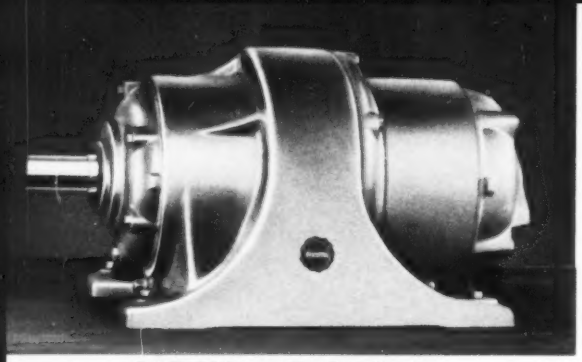
DURABILITY



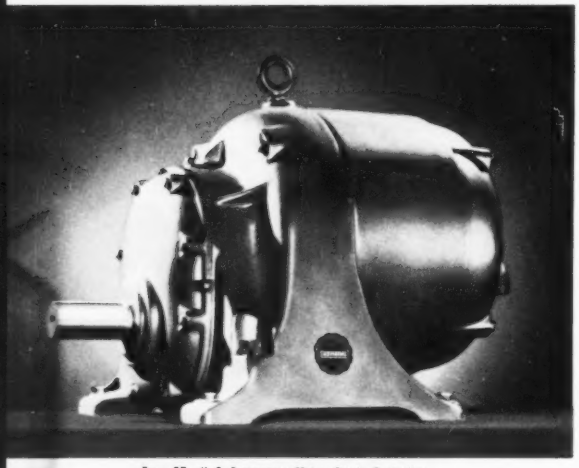
U.S. MOTORS

U. S. SYNCROGEAR MOTOR

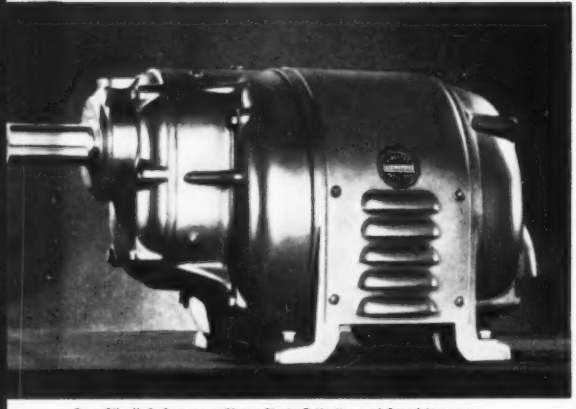
The internally-geared motor with **PYRAMIDAL** *stability*



Type GD – U. S. Syncrogear Motor, Double Reduction



Type GR – U. S. Syncrogear Motor, Single Reduction



Type GH – U. S. Syncrogear Motor, Single Reduction and Speed Increaser

SIMPLIFY

WITH

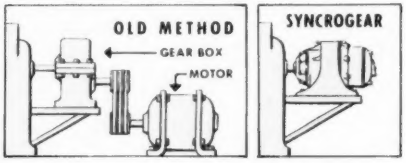
SYNCROGEAR

THE INTERNALLY-GEARED MOTOR

When you need geared power for slow speeds or heavy loads, use this simple hook-up—the *U. S. Syncrogear Motor.* Instead of installing a motor plus gear box or exposed gears, extra coupling and belting, you can direct connect this motor.

The Syncrogear motor is internally-geared within a pyramidal structure which is extremely rigid. Gearing is maintained in perfect alignment and completely enclosed within a sealed housing, protected from dust, dirt and other contaminants. All castings are normalized. The motor windings are asbestos-protected to resist carbonization. The gears are hardened to Rockwell C 45/50 to insure longest life. Dip-splash lubrication automatically feeds the correct amount of lubricant and insures cool gear operation regardless of load.

SAVE SPACE

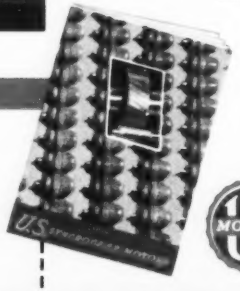


Note the compact setting of the U. S. Syncrogear Motor. It occupies practically no more space than a standard motor. Its integral design saves space so that equipment designers can reduce over-all dimensions and eliminate extra gearing and intermediate connections.

U.S. MOTORS

U. S. ELECTRICAL MOTORS INC.

PACIFIC PLANT: Los Angeles 54, Calif. (P. O. Box 2058).
ATLANTIC PLANT: Milford, Conn.



Atlanta 3, Ga.; Bakersfield, Calif.; Boston 16, Mass.; Chicago 8, Ill.; Cincinnati 16, Ohio; Cleveland 14, Ohio; Dallas 9, Texas; Detroit 2, Mich.; Fresno 1, Calif.; Houston 4, Texas; Indianapolis 4, Ind.; Milwaukee 2, Wisc.; Minneapolis 2, Minn.; New York City 6, N. Y.; Philadelphia 2, Pa.; Pittsburgh 2, Pa.; San Francisco 7, Calif.; Seattle 4, Wash. Sales and Service offices in all principal cities.

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Send your new Bulletin illustrating and describing Syncrogear Motors. ☐
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You Can Do The Work of 3 to 5 Conventional Trucks With Only One ———

DEMPSTER DUMPSTER
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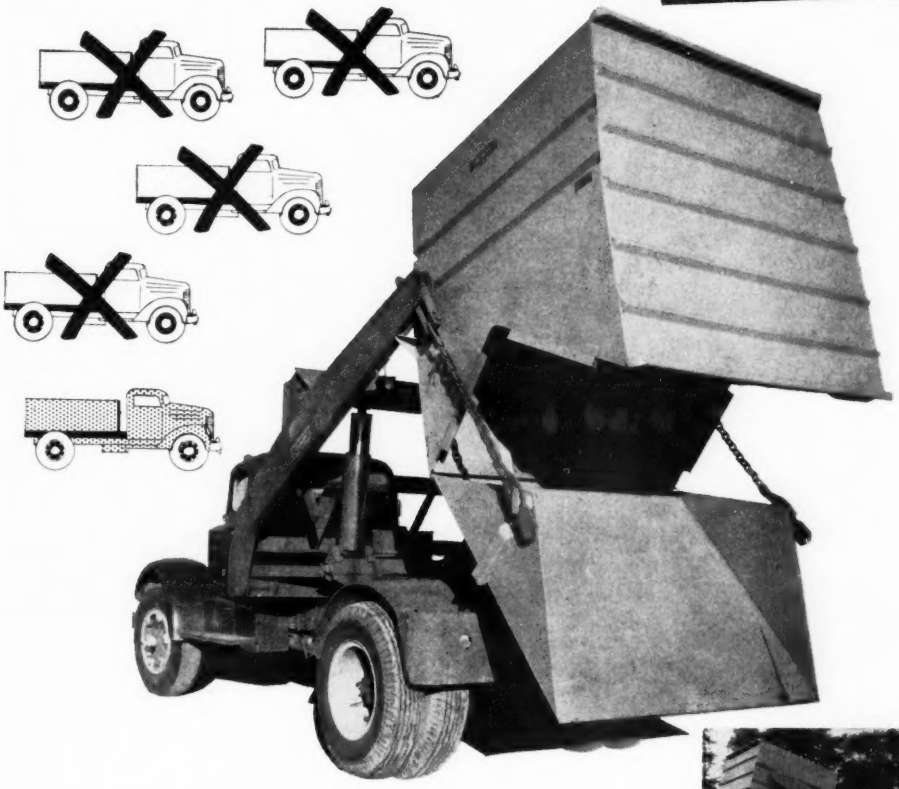


In many plants handling materials by the Dempster-Dumpster System, one truck-mounted Dempster-Dumpster, operated by only one man, the driver, has replaced 3 to 5 conventional trucks and crews. One Dempster-Dumpster services a multiple number of detachable containers in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are conveniently located at accumulation points inside and outside buildings. The Type LFW Dempster-Dumpster shown above handles containers up to 12 cu. yds. Containers up to 21 cu. yds. are available with our Type ARLF and DTLF Dempster-Dumpsters. Without question, the Dempster-Dumpster System is the most economical and most efficient method of plant materials handling by truck yet devised! Write today for complete information. Manufactured exclusively by Dempster Brothers, Inc.

DEMPSTER-DUMPSTER, operated by means of hydraulic controls in cab, picks up each container, hauls and empties it or sets load down intact.

DEMPSTER BROTHERS, 762 Shea Building, Knoxville 17, Tenn.

FULLER FLOOR BRUSHES CUT COSTS BY CUTTING STROKES

With labor costs running as high as $1.25 an hour for maintenance men, the cleaning tools you put in their hands become mighty important. Supply them with Fuller Floor Brushes and cut your maintenance costs. Let one stroke do the work that formerly required two or three. With Fuller Floor Brushes you get a clean sweep with every stroke, no backtracking. You'll find a size and type to meet your every need.

FOR SCHOOLS, INSTITUTIONS AND PUBLIC BUILDINGS

Wide-flaring ends increase sweeping surface, reach dirt in corners and along the baseboards. Pitch-set by hand. Combinations of Nylon and horsehair, also Nylon, horsehair, and fiber for moving sand and heavier soil. Long, flexible trim of material.

FOR LIGHT INDUSTRIAL CLEANING

Staple-set by machine — horsehair and fiber centers, outside row all horsehair. For heavier soil all fiber centers with horsehair outside row to insure a clean sweep.

FOR ROUGH SWEEPING

Inexpensive floor brushes for use on concrete and rough floors where metal chips and heavier refuse have to be swept. Made in a variety of long-wearing, water and oil resistant fibers.

FULLERGRIPT FLOOR BRUSHES

Brush material permanently held in steel backing. Cannot shed. Open back — easy to clean.

All floor brushes regularly stocked in widths from 12" to 36". For specifications on complete line of Fuller Floor Brushes write to . . .

INDUSTRIAL DIVISION
FULLER BRUSH
At home... in business, too

3640 MAIN STREET
HARTFORD 2, CONN.
IN CANADA: FULLER BRUSH CO., LTD., HAMILTON, ONT.

Off-Flavor From Washing Salts

Question—As bottlers of a popular soft drink, we recently were confronted with some isolated cases of spoilage due to microorganisms. A consulting technician traced the contamination to our bottle-washing operation. Here, bacteriological plate tests revealed the presence of viable yeasts and bacteria in bottles coming from the washing machine.

A new, stronger washing compound was suggested, with better germicidal properties. Since employing this new washing compound, we have had no repeated contamination. However, many of our customers have complained of a noticeable change in the flavor of our drinks, which we believe is due to the use of this new detergent. We would like to retain this more effective compound — but we fear that it is adversely affecting the quality of our product. What would you suggest?

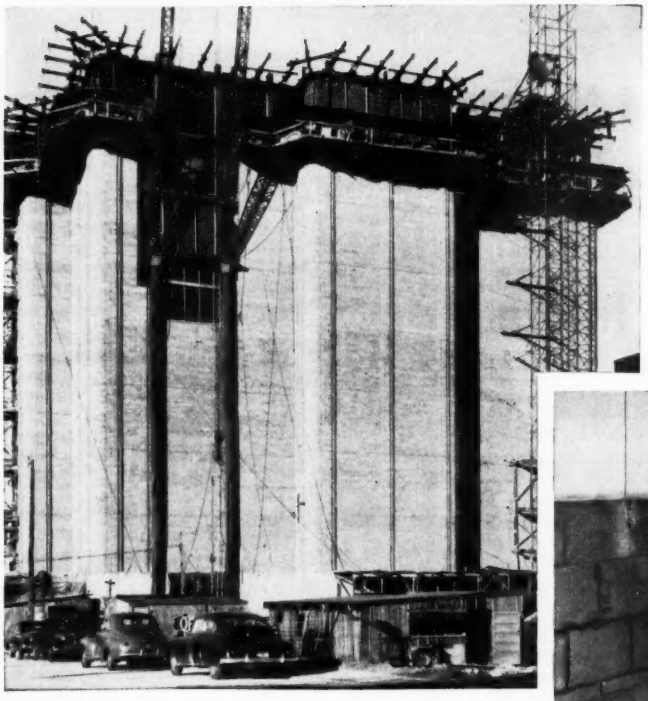
Answer—Undoubtedly, the superior germicidal property of your new washing compound is due to the presence of a greater percentage of caustic soda—the principal sterilizing agent in such detergent blends. Likely, you are getting a slight carry-over of caustic that is influencing the flavor of your product.

A good way to test for caustic carry-over is to add a few drops of phenolphthalein indicator (available at any drug counter) on the inner and outer surfaces of bottles coming out of the washer. A pink or purple color indicates a carry-over.

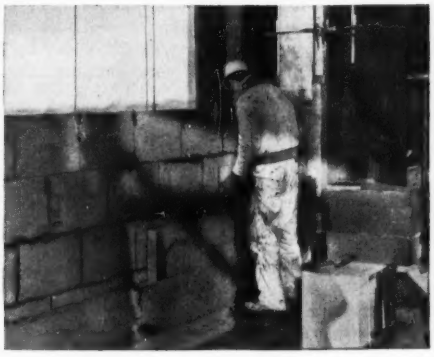
If such is indicated, you must eliminate it by improving the efficiency of your washing operation. While the washer might have done a suitable job of removing the detergent in the former washing compound, the new one obviously contains less chemicals that are primarily devoted as cleansing agents—the extra caustic soda comprises more of the blend.

With less of these cleansing agents in the blend, there is a chance for scale build-up in the washer and more caustic carry-over in the bottles. Scale can be removed from the washer by periodically de-scaling it with muriatic acid. Or, the manufacturer of your bottle-washing compound may be able to come up with a preparation that will effectively retard scale formation and still provide adequate germicidal properties.

If you find that excessive scale formation is not causing you trouble, check the following: Temperature and efficiency of the rinse, soaking time, and concentration of the soaking solution. Conditions that may have been effective with your former compound may not be right for the



New 12-story stockhouse of the Miller Brewing Company, Milwaukee, Wisconsin, is the world's largest, with a capacity of 260,000 barrels. On walls and roof FOAMGLAS helps maintain the required interior temperature of 28°F. Large photo shows exterior masonry wall being laid up against FOAMGLAS. Small photo shows the big light weight blocks of FOAMGLAS built up as a free standing, self-supporting wall of insulation. Architect: Oscar Jannsen, St. Louis, Mo. Insulation Contractor: Sprinkmann Sons Construction Co., Ltd., Milwaukee, Wisconsin.



Time meant money–so they saved a year

Miller Brewing Co. needed an enclosed, well insulated building, to maintain low temperatures. And they needed it right now. By erecting free standing walls of moisture-resistant FOAMGLAS on the steel frame, the building was ready for operation nine to twelve months ahead of schedule, before exterior masonry was completed.

FOAMGLAS is cellular in structure, hence a highly effective insulation. It is made of glass, which repels many destructive elements, so FOAMGLAS gives "good as new" service for years on end without costly maintenance.

In walls, on roofs and under floors of all sorts of structures, FOAMGLAS has proved the ideal aid for maintaining low temperatures. It is also available in standard sizes for piping, in fabricated valve and fitting covers and in special shapes for process equipment.

Whenever you face the need for insulation be sure that you have the latest data on FOAMGLAS. We shall be glad to send you a sample of the material and copies of our latest booklets. Just drop the coupon in the mail today.

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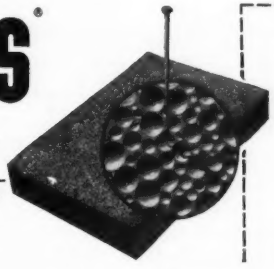
FOAMGLAS®

the cellular glass insulation

The *best* glass insulation is cellular glass. The only cellular glass insulation is FOAMGLAS. This unique material is composed of still air, sealed in minute glass cells. It is light weight, incombustible, verminproof. It has unusually high resistance to moisture, chemicals and many other elements that cause insulation to deteriorate.



Pittsburgh Corning Corporation
Dept. NN-62, 307 Fourth Avenue
Pittsburgh 22, Pa.

Please send me, without obligation, a sample of FOAMGLAS and your FREE booklets on the use of FOAMGLAS for: Refrigerated Structures ☐ Piping and Process Equipment ☐.

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With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No-Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

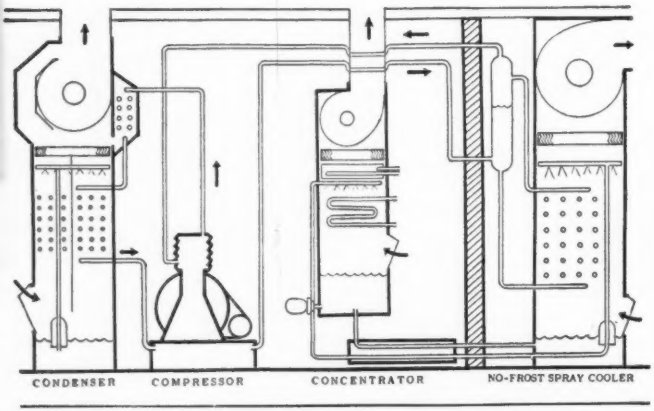
Now, a NEW design No-Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature — not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment — one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use — both for freezing and for moderate temperatures — for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling — for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

For complete information write to the Niagara Blower Company, Dept. FI 405 Lexington Avenue, New York 17, New York.



A simple method, easily maintained. Saves a third of your refrigeration cost. Ask for Niagara Bulletins 118 and 119.

new blend—meaning changes are in order.

Grated Cheese Discolors

Question—A problem that has caused us considerable concern is discoloration of grated cheese vacuum-packed in glass jars. After three months, the cheese turns brown and the appearance of the product does not create much of an eye appeal on a grocer's shelf. Despite the fact that it is still edible, the merchandise is returned and we must suffer the loss. Is there a solution?

Answer—The defect you refer to is attributed to the "browning reaction", common when foods containing amino acids and sugars are exposed to light. Other contributing factors are high pH, high moisture content, elevated storage temperatures, and length of storage.

By switching to a container that protects the cheese from light, you may be able to lengthen the shelf-life of your product somewhat. Furthermore, storing your product in a cool place may also prove helpful.

Preventing Mustard Separation

Question—We have been manufacturing a German style hot mustard for years with no trouble with product separation—until just recently. Now, after our mustard sets 2-3 weeks, the vinegar separates and falls to the bottom of the jar. Can you tell us what is responsible?

Answer—Thoroughly check your formula, method of blending, and grinding operation.

In checking formula, make certain you are using the correct amount of water. More important, be sure that you are using the proper amount of 35-40 grain vinegar.

Next recheck your present blending procedure against previous productions. Determine if the proper amounts of each formula ingredients are being used. This should be simple, since your formula comprises only mustard seed, vinegar, salt, and water.

Finally, check your grinding. And to prevent separation that might later occur from improper grinding, check the following: (1) Smoothness of the Buhr stones, (2) amount of pressure applied, (3) speed of the rotating stones, and (4) rate of flow of the mixture.

Each of these four factors must be carefully re-examined to make doubly sure each step of the grinding process is correct.

RIGHT IN YOUR OWN BACK YARD...
BY WEST
TO HEAR DIEHARD TELL IT, NO INSECTICIDE COULD DO THE JOB IN HIS PLANT··· UNTIL··· YOU GUESSED IT··· HE TRIED "DOUBLE PENETRATION!"
SNA-FOOD KOMPANY
HEY, BOSS, HAVEN'T FOUND A TRACE OF WILD LIFE SINCE LAST WEEKS FOGGING WITH VAPOSECTOR!
H'MM! I'M BUGS, IF VAPOSECTOR DOESN'T DO THE TRICK!
HERE'S THE COST SHEET, BOSS··· 12,000 CUBIC FT. HERE··· SO IT ONLY COST US A BUCK TO FOG THIS WHOLE DEPARTMENT WITH OUR WEST ATOMIZERS!
THEM'S NOT BUGS··· THEY'RE POPPY SEEDS FROM SOMEBODY'S LUNCH-BOX
WHY TEAR UP THE FLOORBOARDS? I CAN'T EVEN HEAR A FADING HEART-BEAT!
REMEMBER THE FIRST VAPOSECTOR DEMONSTRATION? IT POSITIVELY RAINED INSECTS!
I WAS ITCHING TO TELL YOU THAT!
NO SMELL, NO STAIN, NO AFTERTASTE··· VAPOSECTOR QUALIFIES HERE, CHIEF!

DIEHARD'S CASE ISN'T SO UNUSUAL AFTER ALL! In all types of industry West representatives hear comments like "our situation is a special one" . . . "an insecticide is bound to impair the quality of our product" . . . and – stranger still – "we don't have any insect problem here!"

VAPOSECTOR was formulated for the realist who *has* an insect problem and wants to get rid of it – fast! It's fully three times as concentrated as the standard Grade AA spray . . . yet there's no danger of contamination or odor when used according to directions. Vaposector controls insects by "double penetration". When used with West spraying equipment, it becomes a "dry fog" that *penetrates* the most remote crevice . . . then *penetrates* the insect's outer covering for a permanent kill. There's no place to hide. No time to escape. A Vaposector demonstration has often revealed dead insects in numbers never thought possible – simply because they live and multiply in unseen cracks and crevices.

VAPOSECTOR gives more positive control value per gallon than any competitive product. It breaks down into such minute droplets when atomized with specially-designed West equipment, that only one ounce is needed to control flying insects in 1000 cubic feet . . . only two ounces for crawling insects. Compare it with an ordinary mill spray and you'll find Vaposector is over *four times as economical in use!* West can supply Vaposector as well as special mill sprays and fumigants . . . residual and contact insecticides . . . spraying equipment – a *complete insect control program* tailored to your exact needs!

WEST DISINFECTING Company

42-16 West Street
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ASK FOR FURTHER INFORMATION ON HOW TO CONTROL INSECTS BY "DOUBLE-PENETRATION"

Dept. 8

☐ Please send Vaposector booklet.

Please send information on specially-designed permanent ☐, portable ☐, hand spraying ☐ equipment

Name _____ Title _____

Company _____

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PERFECT BALANCE

STATIC DYNAMIC

What PERFECT BALANCE Does:

- Eliminates vibration.
- Lengthens life of machine.
- Permits ceiling suspension (when necessary).

What PERFECT BALANCE Gives:

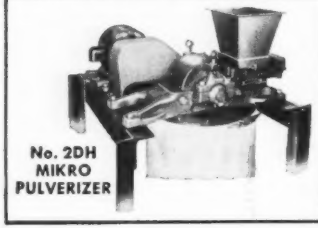
- Flexibility in installation
- Smoother machine operation
- High constant rate of production

Long Life Span

Many of our first MIKRO-PULVERIZERS, built more than a quarter century ago, are still in active service. Perfect balancing of all moving parts has had much to do with this longevity.

Catalog Tells All

If you are presently confronted with a problem concerned with pulverizing or granulation of materials, write today for a copy of the MIKRO illustrated catalog.



No. 2DH MIKRO PULVERIZER

The MIKRO PLAN for Processing Efficiency

This plan has enabled both large and small manufacturers of diverse products to improve quality of product, increase volume and cut both maintenance and production costs. It can also be helpful to you if you have a problem in pulverizing or granulating materials. Just let us know what your problem is and the three-way MIKRO-PLAN will start to work for you. Our engineers will advise the best method and equipment to solve your problem.

PULVERIZING MACHINERY COMPANY

97 Chatham Road • Summit, N. J.

MIKRO-PULVERIZER (FINE) -ATOMIZER (ULTRA FINE) 1950

Reg. U. S. Pat. Off.

Also Makers of the MIKRO-COLLECTOR

PRESERVE OUR HERITAGE: FAITH, FREEDOM AND INCENTIVE

Bottle Handlers

—*Continued from page 170*

vice that actuates a case stop. By this means he stops a case long enough to fill it, then permits it to move on to the cold room as an empty moves up.

In the other installation, the operator stands in front of the case conveyor and controls case movement by a foot pedal.

Experience in a number of dairies with the Mapes system, as it is called, has demonstrated that it has reduced bottle breakage, sped the casing operation (more bottles cased per hour per man), reduced product losses, and cut man-hours and thus operating time.

This system is distributed by Cherry-Burrell Corp., Chicago.

End (*Resume reading on page 128*)

Starch-Jelly Process

—*Continued from page 94*

to it an equal amount of the same chocolate heated to 94 deg. F. to bring total batch down to 87 F.

Tips on Antioxidants

According to H. E. Whitmore, sales manager in charge of food antioxidants, Universal Oil Products Co., Chicago, the ideal method of adding antioxidant to candy is in solution with the flavor extract. He declared that by employing this procedure, the addition can be made without added expense or processing steps.

He also said that butter-type confections can be protected by employing butyl hydroxyanisole alone. This antioxidant is relatively inexpensive, is fat soluble, and does not create color difficulties.

The role of antioxidants in prolonging shelf-life of candies was reported by Helen M. Robinson, Sugarcane Products Div., Southern Regional Research Laboratory, New Orleans. Antioxidants giving the best results were stated to be butylated hydroxyanisole, either alone or in one of the many combinations offered by manufacturers; NDGA (nordihydroguaiaretic acid, which must be added to a batch well below 200 deg. F.); and propyl gallate, often used in combination with other antioxidants.

Certain compounds known as conidendrols gave excellent protection and appeared to be heat stable. Yeasts—both brewer's and primary—show antioxidant properties when used in amounts of 2-3 percent.

End (*Resume reading on page 95*)

You Asked for SPEED . . . for ACCURACY . . . Choice of TOTAL SOLIDS, INDEX SCALES and BUTYRO . . .

You Get *All Three* in the

WORLD'S FASTEST REFRACTOMETER

Featuring

"STOP-WATCH" SPEED!

±.0001 **"LABORATORY" ACCURACY on the PRODUCTION LINE!**

- *Super Speed Readings* . . . from ALL NEW DESIGN! Want analyses in 10 seconds? 15 seconds? You can have the speed your process requires. *No more losses of time, materials and money due to slow readings!* This new Bausch & Lomb *Industrial* Refractometer is strictly a *production* instrument . . . designed and built for use right beside your vats. You'll want several . . . at least one for *each* testing area.
- *Super Speed Loading* . . . new prism design.
- *Super Speed Cleaning* . . . prisms easily, quickly cleaned. Prevents contamination of new samples. Internal parts protected from dirt, fumes, stray liquids.
- *Super Temperature Stability* . . . easier to maintain stable temperatures.

Plus dependable, uniform accuracy of ±.0001. Simplified to basic essentials . . . operated by any average worker. Scales "tailor-made" to seven specific ranges industry requires.

New Bausch & Lomb *Industrial* REFRACTOMETER

SEND TODAY FOR COMPLETE DETAILS

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Please send me complete information on the New Bausch & Lomb Industrial Refractometer.

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Fig. 645

Are your scrubbing nozzles as efficient as you think they could be? Do they resist the corrosion or wear conditions satisfactorily — produce the breakup and distribution you would like?

Outline your spray problem for use—if your liquid can be sprayed with direct pressure at all — Monarch can furnish the nozzles.

NOZZLES FOR:

- **OIL ATOMIZING**
- **HUMIDIFYING**
- **AIR WASHING**
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- **SPRAY PONDS**
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Write for Catalog 6-A and 6-C

MONARCH MFG. WKS., INC.
2517 E. ONTARIO ST.
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Useful New Books & Government Publications

Food Health Aspects

ENGINEERING IN PUBLIC HEALTH. *By Harold E. Babbitt. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., N. Y., 1952. 582 pages; 6¾ x 9¼ in., cloth. Price $8.*

Although written as a general treatise, this survey contains many interesting chapters of special interest to the food processor. Sections on food sanitation, milk, water and public health, ventilation and heating, and sewage and industrial waste treatment are among the most important.

Presented from an engineer's point of view for use by plant people and design engineers, the book explains in extremely concise terms the factors to be considered in any type of sanitation system. In fact, the author has included several pages on the economics of providing good, clean facilities.

Numerous laboratory tests and procedures are discussed as to their relative merits for different situations. Also, plant-design factors are frequently reviewed where they may have a bearing on the ease and convenience of keeping the factory in a really sanitary condition. And there are many valuable process tips for handling food products.

Each chapter is followed by an inclusive list of references.

About Air Contamination

AIR POLLUTION. *Proceedings of the U. S. Technical Conference on Air Pollution. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., N. Y., 1952. 847 pages; 7¼ x 10 in., cloth. Price $12.50.*

A complete record of papers and discussions given at the all-inclusive air-pollution conference recently held in Washington, D. C., is offered in this volume.

Among the various sections—such as agriculture, analytical methods and properties, equipment, instrumentation, and legislation—may be found much authoritative data relating to present day industry problems.

For example, in the equipment section, the following elimination methods are discussed: Bag-type dust and fume collectors, spray and packed towers, condensation technics, sonic-type flocculators, and catalytic combustion.

Many illustrations not originally available at the Conference are also available in this compilation. Among these are cutaway views of the machinery, flowsheets, graphs, and photos of the testing devices.

Those involved in complying with city or state legislation will find the chapter on legal aspects extremely informative. Interpretations of many of our smoke laws are given, along with suggestions to plant operators.

Material-Checking Technics

SYMPOSIUM ON BULK SAMPLING, (STP No. 114). *Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, 1952. 72 pages; 6 x 9 in., paper. Price $1.75.*

This study reports on the problems of sampling materials in bulk form or in packages, accenting the latest technics being used to get reliable results. Sampling costs have by no means been neglected in deriving the discussed methods, which are designed to provide limits of error and probability factors for processing plants.

Subjects include: Materials Handling for Bulk Sampling, Economic Accumulation of Variance Data in Connection with Bulk Sampling, Two-Stage Acceptance Sampling by Attributes, and The Analysis of Variance in a Sampling Experiment.

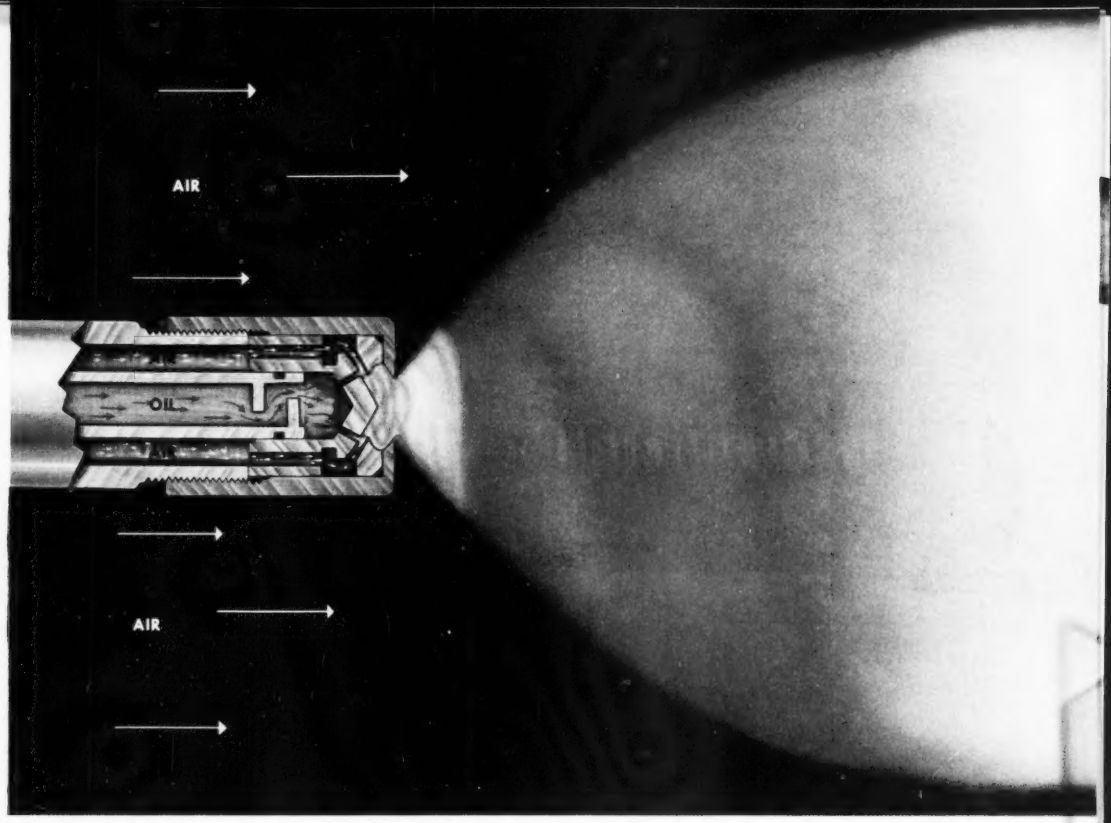
The six papers and discussions comprising this publication were sponsored by the ASTM Committee on Quality Control of Material and were presented at the 1951 meeting of the Society.

On Char Operations

PROCEEDINGS OF THE SECOND TECHNICAL SESSION ON BONE CHAR, 1951. *Edited by Victor R. Deitz. Published by the Bone Char Research Project, Inc., 333 Medford St., Charleston 29, Mass., 1952. 436 pages; 8 x 10½ in., paper. Price $4.*

In this work, the subject matter is presented in four general divisions: Test procedures, defecation preliminary to char filtration, filtration operations, and bone char kilns. The test procedures section (available separately for $2) is expected to form the nucleus of standard methods for testing bone char.

Until now, lack of uniformity in running various physical and chemical tests has handicapped refiners in their efforts to expand researchwise.



NOW—only Powermaster gives you VORIFLOW combustion!

LATEST DEVELOPMENT IN BURNER DESIGN REDUCES COSTS AND INCREASES BOILER EFFICIENCY

Here's what *Powermaster's* new VORIFLOW burner will do for you:

1. Saves fuel by providing infinitely variable combustion modulation in response to demand—with *full efficiency*—through wide range from 30% to 100% of firing capacity.

This means elimination of waste and maintenance headaches because of incomplete combustion. With the exclusive design of the VORIFLOW burner, tiny jets of compressed air pulverize every droplet of oil . . . projecting a fine fog of oil/air emulsion into the combustion area where it ignites and burns —immediately and completely. The VORIFLOW burner does away with outmoded mechanical spinning devices, globules of wasted oil, and gummy cleaning problems.

2. Slashes boiler maintenance costs.

There are *no* moving parts to wear out • There is *no* cup to clean daily. Routine cleaning of the burner once a month is sufficient • There is *no* burner vibration to throw adjustments "out of whack" • Parts are made of stainless steel, brass, and beryllium copper—they will last indefinitely.

3. The combination burner permits rapid change-over from one fuel to another—light oil, heavy oil, or gas.

And when we say "rapid" we mean just that—the job can be done in four minutes. Modulating firing controls are ready to go into action at the flick of a switch. It isn't necessary to change the entire burner assembly. All you need to do to fire gas is to remove the oil nozzle.

Before deciding on a boiler for your plant, be sure to get the facts on the newest POWERMASTER with VORIFLOW combustion. Write for this catalog that gives you the entire story of the *Powermaster* packaged automatic boiler. Just drop us a line and we'll put one in the mail for you.

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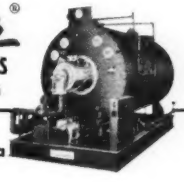
In sizes to 500 HP; pressures to 250 psi



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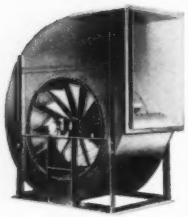
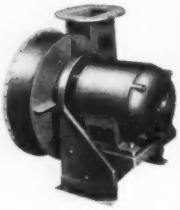


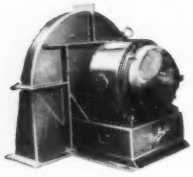
LIMIT-LOAD FANS

For large-scale ventilation. Quiet, non-overloading. Sizes up to 500,000 c.f.m. Bulletin 3737.



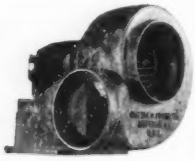
TYPE "CB" PRESSURE BLOWERS

For single-stage pressure blowing up to $2^{1}/_{4}$ pounds, per square inch. Bulletin 3553-A.



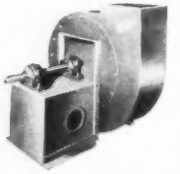
TYPE "CC" PRESSURE BLOWERS

In sizes for pressures up to 4 pounds and capacities up to 75,000 c.f.m. Bulletin 3553-A.



BABY CONOIDAL FANS

Compact, for portable or duct-connected service. Quiet, efficient. Bulletin 3499.



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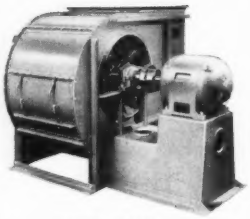
With interchangeable wheels for air exhausting or materials conveying. All-welded. Bulletin 3576.

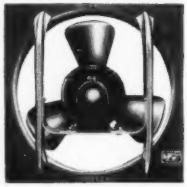
AXIAL FLOW FANS

For light-duty ventilation and air conditioning service. Compact, non-over-loading. Bulletin 3533-C.



POWER PLANT FANS

Primary, forced draft, induced draft—built for the severest service. Bulletin 3750.

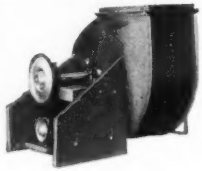


BREEZO FANS

Easy-to-install wall fans. Durable and very economical. 6 sizes. Bulletin 3222-F.

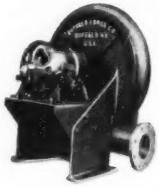
VOLUME FANS

For blowing or exhausting, up to 10" s.p. 8 discharge positions. Bulletin 3615-A.



BELTED VENT SETS

Compact, "package" fans for duct or free-air delivery. Non-overloading. Bulletin 3720.



"RE" BLOWERS-EXHAUSTERS

Larger versions of "Buffalo" "E" Blowers, in sizes from 50 to 1600 c.f.m., for pressures up to 40" of water.

BELT-AIR FANS

Efficient, quiet wall fans for free air delivery up to 19,000 c.f.m. Bulletin 3222-F.

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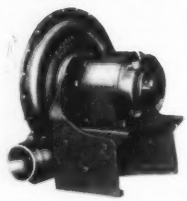
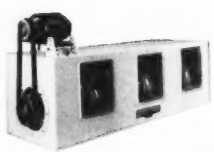


"E" BLOWERS-EXHAUSTERS

For oil or gas furnace, blowing fine boosting, cleaning. Bulletin 3014-C.



SHORTBOY VENTILATING SETS

New high efficiency all-aluminum blowers with hollow shaft. Bulletin 3701.

Fifteen time-tested procedures are presented—a collation of a survey of all existing refinery methods. The remainder of this volume is concerned with the specific papers presented at the second technical session. A number of pertinent illustrations have been added to round out the book.

Government Publications

FEDERAL AND STATE WEIGHTS AND MEASURES LAWS (*Through* 1949 *Enactments*). *National Bureau of Standards, Circular* 501, 1182 *pages. Price* $5.75. This compilation supersedes the 1926 and earlier editions. A comprehensive index is included.

TOXICITY OF INSECTICIDES, FUNGICIDES, AND HERBICIDES. *Unnumbered document issued by Agricultural Research Administration, U. S. Department of Agriculture.* Reports panel study of current research and research needs in these fields.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

COMPARATIVE EFFICIENCY OF CURRENT METHODS AND TYPES OF EQUIPMENT USED FOR RECEIVING FIELD BOXES OF APPLES AT STORAGE HOUSES IN THE PACIFIC NORTHWEST AREA. *Available from Production & Marketing Administration, U. S. Department of Agriculture.* Summarizes a study by Marketing & Facilities Research Branch. Included are comparative cost studies.

PASTEURIZING LIQUID EGG UNDER COMMERCIAL CONDITIONS TO ELIMINATE SALMONELLA. *Available from Production & Marketing Administration, U. S. Department of Agriculture.* Gives details of process developed by Poultry Branch.

APPLIED RESEARCH IN THE UNITED STATES. *National Research Council, Publication 210. Price* $1. *(Order from N. R. C., 2101 Constitution Ave., Washington 25, D. C.)* Outlines American practices in applied research in the natural sciences and engineering, purpose being assistance of research administrators in Governments and industries of other countries. (Report was prepared for Mutual Security Agency.)

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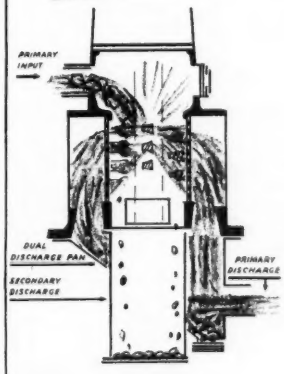

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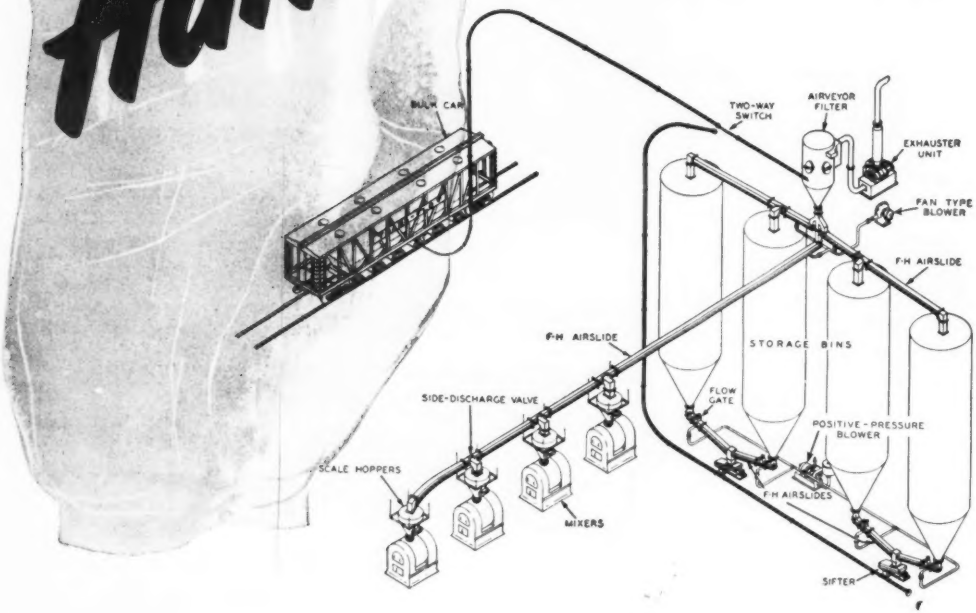

Fuller's "Engineered-Flow" method of handling bulk flour in the bakery, not only assures substantial handling economies at volumes of two carloads a week and more; it is now recognized as economically feasible, even for much smaller volumes, because it virtually eliminates the in-plant infestation caused by outmoded, obsolete conveying equipment.

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A-134

"Chemical" Softeners Ruled Out In Final Standards for Bread

Polyoxyethylene type emulsifiers, or "softeners," will not be allowed in the five major breads under new standards just issued by the F&DA, although they are permitted in special breads not covered by the law. Effective date is August 13.

The polyoxyethylene monostearates and related compounds, which have been offered to the industry as softeners or emulsifiers, were ruled out on these grounds:

"First, that use of the softeners could deceive consumers as to the age of the bread; and second, that the proposed materials (polyoxyethylene monosterate and related compounds) had not been adequately tested for their safety as ingredients of bread."

However, F&DA stated that if further tests develop a definite conclusion as to the safety of the chemicals, the hearings will be reopened. But meanwhile it was felt that there should be no further delay in issuance of the long-awaited standards.

Five primary types of bread are covered by the new law: White, enriched, milk, raisin, and whole wheat. Other types may have the questioned softeners included in their formulas—provided such additives are declared on the labels, along with all other ingredients.

Clarify "Optionals"

Status of the so-called optional bread additives was also brought up to date, as is summarized below:

Shortening—Not limited in quantity (but ordinarily used in small amounts). Lecithin, or mono—and diglycerides, made from natural fats and oils, may be added, up to specified maximum concentrations.

Milk—The sole moistening ingredient allowed in milk bread, but may be used in lesser amounts in all four of the other standard breads. Also permitted in its processed forms—condensed, evaporated, dried, etc.

Eggs—Various forms of liquid, frozen, or dried eggs may be employed.

Sweetening agents—Brown and white sugars, dextrose, honey, corn syrup, and molasses (though not blackstrap) are all on the acceptable list.

Spices—May be added, but their presence must be conspicuously declared on label.

Yeast foods—These additives (also known as "dough conditioners" and "bread improvers" stimulate yeast growth and compensate for variations in flour and water supply. Certain calcium and ammonium salts, such as calcium sulfate and lactate, and ammonium sulfate and chloride, may be added in very small amounts for this purpose. Also potassium iodate and bromate, or calcium peroxide, can be employed in minute quantities, as in the past.

Mold and spoilage inhibitors—Limited amounts of vinegar, lactic acid, monocalcium phosphate, sodium propionate, calcium propionate, or sodium diacetate, are permitted for preventing growth of mold and other spoilage organisms in the loaf, thus prolonging its bread box life.

Ground dehulled soy beans—Used for many years in small amounts (½ percent by weight of flour) because of enzymatic activity to lighten the color of bread or rolls made from unbleached flour.

Flours other than wheat flour—Not more than 3 percent corn, potato, rice, or soy flour, and various food and dextrinized starches are permitted for such purposes as making slight changes in flavor, preventing rapid bread drying, and dusting.

Listed as not permitted were: Concentrated water extract of raisins and prunes, cottonseed flour, peanut flour, rolled oats, oat flour, and many chemicals.

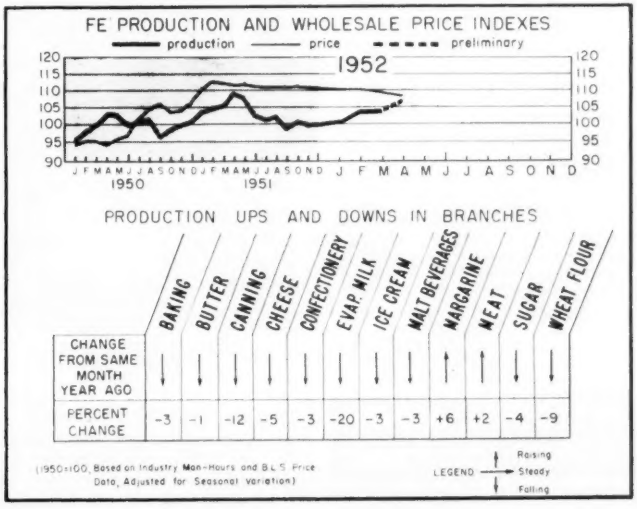
To Fight New Standards

Atlas Powder Co., major producer of polyoxyethylene type emulsifiers, have gone to court. In a statement issued immediately after the new bread standards were announced, Atlas accused the Federal Security Agency of "favoritism which would deprive bakers of freedom of choice" because older type glycerides are permitted while its polyoxyethylene additives have been turned down.

Atlas President, Isaac Fogg said: "We believe in protecting our business against unfair administrative rulings that in effect favor our competitors."

On the other hand, the American Bakers Assn. said that bakers generally are in accord with the standards. ABA Chairman Curtiss H. Scott reported:

"The baking industry cooperated fully with the F&DA in preparing the



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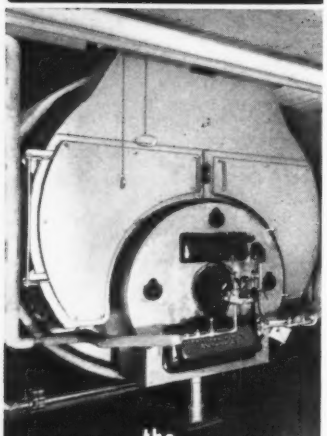

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standards in the full knowledge that the interest of the consumer is paramount to the industry as it is to the F&DA. Exclusion of the so-called chemical softeners was consistent with our recommendations."

The entire emulsifier picture may be opened for further hearings soon—at which time both the polyoxyethylene and glyceride additives will be up for more intensive scrutiny. Although the latter types now have a clean "bill of health," they are said to be under suspicion by many.

FSA had approved them as optional ingredients, based chiefly on the hearing record. But observers point out that this record was meager on experience and experiments with these older emulsifiers.

Improved Animal Shortening

"Tasteless, odorless, and heat stable"—that's how Armour and Company describes the new cake shortening from lard just evolved at its development laboratories.

Heretofore, lard shortenings were primarily used for pies and biscuits, and vegetable types only assigned to cake baking. Now, according to Armour, its new catalytically prepared product can be used for either type.

Made by heating lard for from 5 to 20 min. in the presence of a catalyst like sodium methoxide or ethoxide, the shortening is stated to withstand a high degree of heat, and it may be used for French frying.

The company is making the new product at a refinery in Chattanooga, and in a short while it will also have production under way at its Fort Worth plant. The shortening is being sold to bakeries.

Why Not Brown Sugar?

Many bakers and confectioners would do well to weigh the relative merits of brown sugar vs. white in their formulas, according to Louis Lang of the National Sugar Refining Co., Philadelphia.

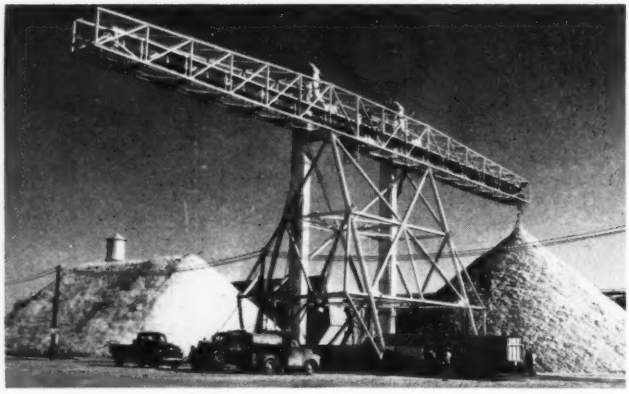
Addressing the recent Production Conference of the Pennsylvania Mfg. Confectioners' Assn., he pointed to many advantages of the less costly brown variety.

Its color and unique flavor, he said, are ideally suited to use in butterscotch or molasses items, or as a background for maple flavors or caramels. In addition, the brown variety usually contains some invert sugar—which ordinarily is purchased at a premium.

Supercharged Cleaner

A new electrostatic separator for cleaning corn, developed by the Quaker Oats Co., is claimed to bring virtual purity in a product that has long defied the most rigorous combination of mechanical cleaning methods.

Already installed in five of the company's mills, the new cleaner supple-



Unique Boom Speeds Piling

This cotton-seed piler at Phoenix plant of Producers Cotton Oil Co. expedites receiving and storage. Seed arrives at plant in large volumes during harvest and must be kept outside until processed. It is unloaded from trucks onto elevator conveyors, which carry it up perpendicular columns to top conveyor belt. Then it is piled 50-ft. high on both sides of 125-ft. track (upon which unit runs). Fabricated by Consolidated Western Steel Corp., U. S. Steel subsidiary, the stock piler has capacity of 80 tons of seed per hour and can pile 22,500 tons of seed along track.

BERTON S. CLARK

IFT Slate Set

Dr. Berton S. Clark, scientific director of American Can Co., has been named president-elect of the Institute of Food Technologists. Nominated to posts on the IFT Council: H. C. Diehl (Refrigeration Research Foundation), G. Garnatz (Kroger), Dr. L. B. Howard (U. of Illinois), Dr. W. A. MacLinn (Merck), and H. S. Mitchell (Swift).

ments older mechanical units—which by themselves remove about 90 percent of the impurities. The separators consist of electrically grounded conveying rolls which take the grain into a 30,000 v. field.

Electrical charges on the impurities differ from those on the corn, allowing the former to be deflected into special bins. In actual operation, several passes through the field are necessary.

The company plans to offer its system to other millers on a lease basis. In addition, it foresees use of the separators in allied branches of the food field—the machines being considered to have excellent possibilities with many free flowing food ingredients or materials.

Tips for Better Ice Cream

Oxidized storage fats may quite frequently be the cause of off-flavors in ice cream—especially if the dairy additives have been on the shelf any great length of time.

So states George R. Greenbank, Bureau of Dairy Industry, USDA, who suggests several tests on how best to spot deterioration of milk, butter, and cream.

Milk's susceptibility to the development of oxidized flavors may be detected, he point out, by the change of the oxidation-reduction potential when copper is added to a sample.

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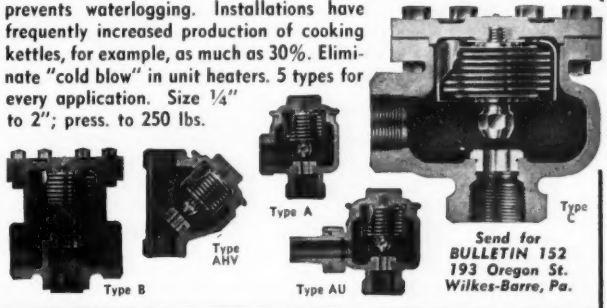

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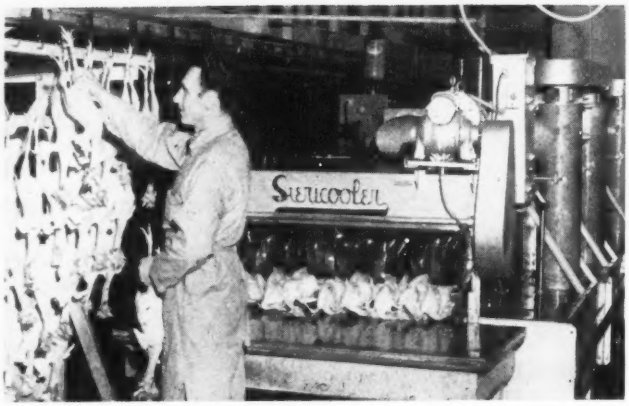

"Borrows" Better Cooling

To cool its poultry aseptically and efficiently, a method developed for fruits and vegetables (p. 57, June '49 "Food Industries") has been adapted by V. Melani Poultry Co., Palo Alto, Calif.

The company recently installed a special version of the Stericooler shown here. This unit provides economical, continuous cooling which allows the birds to be shipped the same day they're killed.

Consisting of three sections—each with recirculating water sprays—for progressive, washing, cooling, and sterilizing, unit can process a 3½ lb. chicken in 1½ hr. to a center temperature of 35-40 deg. F.

The first, or pre-wash, section, cools birds with water at about 64 deg. F. Second section then chills them with crushed-ice cooled water at 52-55 deg. F., and also kills any surface bacteria with a chlorine-type germicide added to the spray. Third section finishes job with a spray kept at 32-36 deg. F.

Constructed from stainless and galvanized iron, unit is 22 ft. long and 5 ft. 6 in. wide. One man can handle entire operation, turning out over 1,500 lb. of cooled poultry per hour. Product is said to have an improved "bloom." And usual weight loss is stated to have been cut in half with new process.

Bacterial research is reported to show that aerogenes or coli type bacteria cannot survive the chlorine treatment, with total reduction of bacteria on poultry's skin running well over 95 percent. This cooler was developed by Food Machinery & Chemical Corp.

The latter must be held for a definite period at 5 deg. C. before being tested.

Butter can be checked in this manner: Store the sample at 68 deg. F. and then determine the change in Peroxide Value. Increases in P.V. correlate well with degradation of ice cream product. As a consequence, always use butter with the highest P.V. first.

Cream (45-55 percent fat) should have a titratable acidity of 0.2 percent or below to be satisfactory for freezing. Oxidation-reduction potentials can also be adapted in the testing of cream, but the copper content should be about half that used in the milk test.

Coast Liquid-Sugar Plant

Amalgamated Sugar Co. has placed in operation its first Pacific-Northwest plant for production of industrial liquid sugar. Located at Portland, Ore., the plant will process beet sugar for the manufacture of liquid sucrose and a blend of corn syrup and sucrose.

The sugar will be used by canners, packers, bottlers, bakers, candy makers, ice cream manufacturers, and others. A feature of the plant is a bulk silo 110 ft. high which can store 4,000,000 lb. of dry sugar.

Gage of Chocolate Chill

Temper-testing of chocolate by a modified cooling-curve method was described by E. W. Meyers and Arthur S. Graham, of the Hershey Chocolate Corp., Hershey, Pa., at the sixth annual Production Conference of the Pennsylvania Mfg. Confectioners' Assn.

Now, temper can easily and accurately be determined with an inexpensive dry-ice acetone cooled apparatus similar to that used in conventional cooling curve tests. The revised method is stated to differ from the older one in these respects:

(1) Two factors are measured—cooling rate and temperature of active crystallization, with all the results expressed mathematically; (2) results may be duplicated with greater ease

than before; (3) once the critical values have been established for a sample of properly tempered chocolate, it becomes a simple matter to check subsequent batches without need for the long procedure each time.

The two measurable factors are defined as follows:

Cooling rate — Expressed as the temperature change in deg. F. per min. A rapid initial cooling rate indicates a small percentage of crystal nuclei present. A larger percentage of crystal nuclei would promote greater and more active crystallization, with a resulting gradual liberation of latent heat, hence less rapid cooling.

Active crystallization — The temperature at which the chocolate first shows a marked change in its cooling rate. Active crystallization at a low temperature is synonomous with super cooling and is due to the formation of a small amount of crystals.

Fewer Candy "Stales"

Shelf life of butter cream candies may be almost doubled by adding glycerine. This has been brought out through a joint research project of the USDA and the National Confectioners Assn.

Glycerine—in quantities up to 2 percent—apparently retards the formation of free fatty acids, which often impart disagreeable tastes and odors to the creams. On the other hand, antioxidants have no inhibiting effect on this serious problem of free acid formation, though effective against peroxide formation.

Quick Bean-Oil Assay

A rapid method for determining the oil content of vegetable beans has been developed by the USDA in co-

"STINKS!"

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM RATIO COUNTING SCALE

Another Detecto-Gram Scale to speed counting operations. Model #1743 has a special counting tray attached to the beam for use when counting in odd amounts.

Write for Catalogue

DETECTO SCALES • INC.
MAKERS OF FINE SCALES SINCE 1900
542S PARK AVENUE • BROOKLYN 5, N. Y.
SCALE ENGINEERS IN ALL PRINCIPAL CITIES

MODERN TIME AND COST SAVERS BUILT BY... Standard GRAVITY & POWER CONVEYORS

FASTER HANDLING IN SHIPPING ROOMS... With the HANDIBELT

Conveys bags, cartons, boxes horizontally or at any decline and incline angle within its range. Easily wheeled about by one man—easy to adjust and use — fits in crowded aisles, cars and freight elevators. Handles packages up to 135 lbs. TWO SIZES: No. 11 Handibelt, 11 ft. long, piles to 7 ft. 6 in.; No. 16, 15 ft. 9 in. long piles to 10 ft. 6 in. Write for HANDIBELT Bulletin — address Dept. FE 62.

FASTER PILING IN WAREHOUSES ...with the HANDIPILER

For loading, unloading, stacking and elevating sacks, boxes, cases, and cartons. Adjustable boom reaches to rear of storage piles or far into cars, trucks, trailers. Reversible apron — conveys commodities up or down. Piles to 17 ft. — handles packages up to 100 lbs. Saves lifting — carrying — cuts handling time in half. Write for HANDIPILER Bulletin—address Dept. FE 62.

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General Offices: North St. Paul, Minn.
Sales and Service in Principal Cities.

Send for Standard Bulletin No. 63-B describing gravity & power conveyor units. Address Dept. FE 62.

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Complete warehousing services • Served by 4 railroads, 30 truck lines • 1,500,000 square feet

Overnight distribution to area of 40 million persons between eastern seaboard and Mid-west

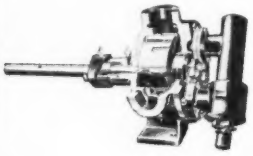
For details, write or wire

LEHIGH-HORSEHEADS WAREHOUSE CORP.

Horseheads, N. Y. or 98 Frelinghuysen Ave., Newark, N. J.

VIKING

FEATURES THAT MAKE FOR GOOD PUMPING



1. **ONLY TWO MOVING PARTS.** Both large and rugged and each self-supported. No small intricate parts requiring frequent replacement.

2. **SELF PRIMING** on suction lifts up to 20 feet or vaporization limits on volatile liquids. Smooth, even discharge. No pulsation.

3. **SLOW SPEED—LONG LIFE.** Reduced speeds of Viking pumps prolongs life and still retains large volume.

4. **OPERATES IN BOTH DIRECTIONS.** Viking pumps operate equally well in both directions. Simplifies ordering and installation.

5. **SINGLE STUFFING BOX.** Long, leak resistant stuffing box. Easily serviced.

VIKING
AN HONORED NAME IN PUMPING

Get the complete story on Viking Pumps for the food industry today. Send for free copy of Bulletins D100E and E-100E.

Viking PUMP COMPANY Cedar Falls, Iowa

See Our Catalog In SWEETS

operation with an industrial firm specializing in electronic equipment.

Heart of the assay is a high frequency oscillator for measuring the quantity of oil in a solvent. Procedure consists of grinding the beans to be analyzed (soybeans were used in the tests) with an oil solvent—the vegetable oil being extracted during comminution.

The solvent is then filtered and placed in the electronic oscillator, which measures the sample's dielectric properties. This reading is converted to percent oil in the bean by reference to a conversion table developed by

(Turn page)

Hors d'Oeuvres

• *With the advent of modern lighting, whale oil has been seeking new outlets. And now its most recent 20th century application is making inroads into our daily lives: Cleaning and polishing rhinoceroses in zoos.*

• Back in 1887, a Chicago baker did a rushing business with a loaf of bread called "painter's rye"—half whole wheat and half rye. It was found to be excellent for cleaning fancy wallpaper. Just the thing for every artisan's lunchbox.

• *Norwegian whalers have successfully adapted a pilot-plant flash dryer to the actual shipboard recovery and drying of whale meat solids discharged from oil-recovery centrifuges. No part of the whale is wasted now except the spray mechanism.*

• One of our larger millers runs a "barnyard school" where hens are taught how to play cards, pigs how to wrestle, and rabbits to read—all for sales promotional stunts. Should teach the rabbits the facts of life.

• *Synopsis of recent USDA bulletin titled, "Food Guide for Older Folks": Eat plenty of good food.*

• It's estimated that a quarter of a billion pounds of store-surplus bread are returned each year to bakeries (out of a total of 17.5 billion pounds baked annually. Needed—a merchandising expert who knows what women want on any given day. Like the job?

• *Dressed Colombian beef may soon be flown directly to Chicago to compete for the American housewife's dollar. Hey diddle diddle, the cat and the fiddle, and the cow is jumping over the moon on a thrice weekly schedule.*

• A new health source may soon supplement our daily diet—a fluorescent light that gives off vitamins which can be absorbed by the human body. How many watts-worth of what color will you have with your meal?

Checkmate! RISING ICE COSTS

with a YORK-FLAKICE AUTOMATIC ICE MAKER!

Install a York-FlakIce DER-150A—and in one move get all these advantages . . .

SAVE ON HANDLING COSTS! The DER-150A eliminates labor costs in crushing, handling and hauling. Delivers ready-to-use York-made fragment ice *where* it's needed.

SAVE ON OPERATING COSTS! The DER-150A makes ice at extremely low cost per ton. Daily capacity from 11 to 25 tons.

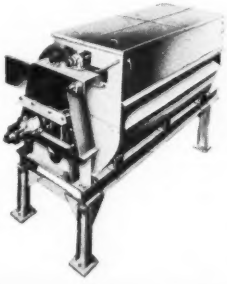
CUT COSTLY SHRINKAGE! The DER-150A eliminates melt-age losses of crushed ice. Here are curved ice particles that overlap, prevent air infiltration . . . that stay frozen *longer*.

SAVE FLOOR SPACE! The DER-150A takes up a minimum of valuable floor space in your plant.

SAVE TIME! This famous ice maker delivers York-made fragment ice at any hour day or night—more surface area of ice particles gives faster cooling of water and concentrates—for sausage-making, bakery dough mixers, etc.

. . . Yes, York-made fragment ice does do a better icing job than ordinary crushed ice. It cools faster because it has more cooling surface. Fragile particles are gentler on processing machinery and won't bruise or discolor delicate perishables.

There's an important place for a York-FlakIce Automatic Ice Maker in *your* food processing picture. Get the details from your nearby York Representative today. Or write to York Corporation, York, Pennsylvania.



YORK-FLAKICE AUTOMATIC ICE MAKER DER-150A

York-FlakIce Automatic Ice Makers range in capacity from 300 lbs. to 25 tons a day. Adaptable to multiple unit and overhead installations. Built by the York Corporation—manufacturers of more "packaged" ice makers than all other firms combined.

York refrigeration air conditioning

The big advances come from YORK

Headquarters for— **Refrigeration and Air Conditioning**

Another Leader in the Coffee Industry chooses CONSOLIDATED *High Speed* COFFEE UNITS

● Consolidated Type 45-C-10 High Speed Coffee Weighing Units with 10-head scale fill, weigh and settle 100 ½, 1 or 2 lb. cans, jars or cartons per minute. Progressive packers, like the Old Judge Coffee Company, use the C-10.

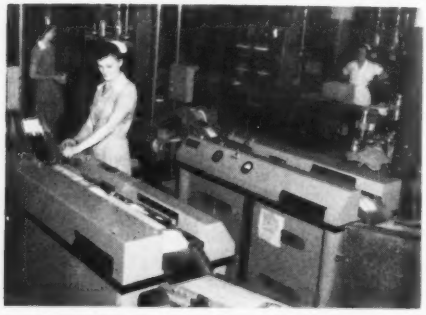
Conveyor is equipped with vibrating settler and package control. Scale weighs to an accuracy of 1/16 oz. over or under. Once machine is set, operation is fully automatic.

The Consolidated C-10 handles the full range of coffee grinds... drip, percolator, regular, silex and steel-cut. Write for information on Consolidated machines for the food industry.

CAPEM Screw Cappers **SEALTITE Bag Sealers** **HOEPNER Bag Sewers**

CONSOLIDATED PACKAGING MACHINERY CORP.
1400 WEST AVENUE · BUFFALO, NEW YORK

Meeting the Challenge in Packaging Modernization. .



EXACT WEIGHT Selectrols (electronically operated) automatically checkweighing after dinner mints in the plant of Thos. D. Richardson Co, Philadelphia, Penna.

Packaging takes a pretty stiff bite out of total production costs. This is why substantial capital expenditures are going into 1952 modernization. Equipment-wise top management attending the National Packaging Exposition in Atlantic City were seeking answers to (1) reduced operating costs (2) increased plant output (3) reduced physical labor (4) smaller losses per unit package (5) speed or improved packaging (6) assured reliable operation. EXACT WEIGHT Scales, individually or with allied and coordinated equipment meet this challenge squarely. One group of models the "Selectrol", electronically controlled, and illustrated above delivers 100% product check at high speed. Many other models, semi-automatic in type, accomplish like results with minimum human effort. Hundreds of models are available for packaging tasks that by virtue of their nature require manual application. Of one thing you can be sure. If it's EXACT WEIGHT Scale equipped it meets the challenge for saving time, money, product and labor. Write for details to fit your operations.

EXACT WEIGHT SCALES
Industrial Precision
THE EXACT WEIGHT SCALE COMPANY
910 W. Fifth Ave., Columbus 8, Ohio
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previously analyzing a large number of samples with the customary chemical method.

Results on a single sample can be obtained in about 15 min., as contrasted with several hours for the usual chemical approach.

Continuous Dough Making

Hottest development in the bread-baking field is the continuous, "no-time" dough-making process—now in the pilot-plant stage. The talk of the industry, this new procedure (being tested by Wallace & Tiernan Co.) aims to overcome the disadvantages of lengthy fermentation times. However, no official information has been released up till now.

Eliminated by the new process are sponge fermentation, floor time, dividing, rounding, overhead proofing, and molding steps.

As described to FOOD ENGINEERING editors by people in the bakery field, the method involves a 5-hr. primary fermentation of sugar, water, yeast, and yeast foods followed by preblending the entire formula, which takes only 1½ min. The formula, incidentally, contains a powerful oxidizing agent.

Finally the dough is continuously mixed, extruded in ribbon form through an orifice, cut to pan size, and deposited into pans. Temperature of the dough at this point is about 100 deg. F., thus proofing occurs immediately. Overall time from mixer through oven takes about two hours.

The process is said to do away with a number of flour-scaling units and mixers, a fermenting room, dough troughs, dough hoists, as well as a dough divider, rounder, overhead proofer, and molder-panner in the average bakery. It is also said to eliminate the flour dusting and dough-trough greasing operations.

Some cost-minded bakers foresee annual operating savings of upwards of $50,000. And by some accounts, a baker installing the new units stands to save about $140,000 on his initial outlay.

Physical appearance and flavor of the loaves are considered excellent.

Frozen-Milk Flaking Clues

Reasons behind the flaking of protein in frozen whole and concentrated milks are now being clarified in an investigation at the University of Minnesota by S. T. Coulter.

In a recent report to the Refrigeration Research Foundation, Professor Coulter states that through dialysis—a chemical separation procedure—he has uncovered several clues to the

CHEVROLET Advance-Design TRUCKS

Buy on these plain, hard FACTS!

CHEVROLET first in demand in value in sales

Fact No. 1

COSTS LESS TO BUY

Payload pound for payload pound, a Chevrolet truck *lists for less* than any other truck with the qualifications to handle your job. As the world's largest manufacturer of trucks, Chevrolet takes advantage of production economies to pass substantial savings on to you!

Fact No. 2

SAVES MONEY ON THE JOB

Chevrolet trucks save you money over the miles with great proved features that cut costs. Valve-in-Head economy, rugged Hypoid rear axles, extra-sturdy channel-type frames and Flexi-Mounted cabs, Ball-Gear Steering, Synchro-Mesh Transmission.

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Your first interest in a truck is: "How well will it do the job?" That's where Chevrolet trucks have it, because they're factory-matched to the payload—tires, axles, frame, springs, engine, transmission, brakes. You get as much truck as your job calls for.

Fact No. 4

KEEPS ITS VALUE LONGER

Chevrolet trucks traditionally keep their value longer to bring higher used truck prices, year after year, at trade-in time. That means real, substantial dollar-and-cents savings when you wish to replace your present truck with a new one.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

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LA PORTE

FLEXIBLE STEEL CONVEYOR BELTING

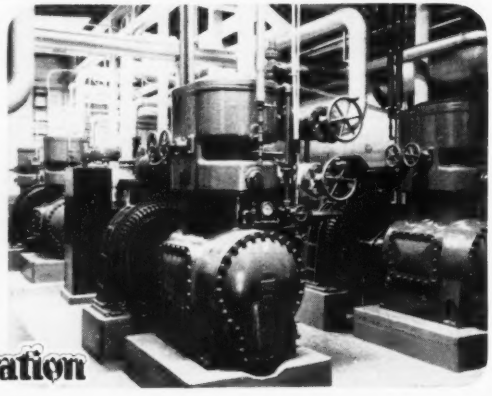
Processing, packing, shipping—all are easier and more quickly and economically accomplished with rugged LaPorte Belting. Here is versatile equipment that steps up every food handling operation from loading hopper to shipping room . . . and is built to withstand years of the heaviest use and abuse.

The FLEXIBILITY of LaPorte Belting means that belt grips friction drum tightly over its entire surface. No creeping, weaving or jumping! Provides flat, safe surface for containers empty or filled! *Durable Steel Mesh Construction* facilitates cleaning . . . permits circulation of air and liquids around products in process. Highly resistant to heat and cold. Find out about the many advantages of LaPorte Belting.

Write TODAY for Literature and Prices—No Obligation

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

Four of Seven Frick Ammonia Booster Compressors in Service at the Fairmont Canning Plant, Fairmont, Minn.



FRICK
Refrigeration

Serves Fairmont Canning Company

This famous Minnesota producer of frozen food uses eleven large Frick booster compressors, and six Frick second-stage machines, in its various plants, for maintaining low temperatures with economy and dependability.

The really important jobs – whether air conditioning, ice making, food freezing or other cooling work – call for Frick Refrigeration.

DEPENDABLE REFRIGERATION SINCE 1862
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

Frozen Bread to Alaska

Seen here headed north is a load of frozen bread that Vix Box Lunch Co., Seattle, is routing to Pacific Catering Co., Anchorage, Alaska, to help ease the latter city's grave shortage of the staff of life. Specially insulated (with air space and aluminum foil) and carrying 200-400 lb. of dry ice, these wooden walk-in shipping boxes are being used in lieu of refrigerated space, now scarce. The boxes hold some 3,000 lb. of the frozen bread.

true cause lying behind this protein precipitate.

He has found that either lactose, a mixture of salts, or possibly unidentified compounds are responsible for the flaking.

Up until now, the frozen milks had to be kept between minus 15 and minus 20 deg. F. to prevent this solids formation.

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Raspberries for processing, new, page 3441, Apr. 18 *Federal Register*, effective May 18.

Currants for processing, new, page 3443, Apr. 18 *Federal Register*, effective May 18.

Frozen asparagus, second revision, page 3443, Apr. 18 *Federal Register*, effective Apr. 18 ("upon publication").

Eggs and egg products, revised, proposed, page 3606, Apr. 23 *Federal Register*, written comments received until May 23 (among other proposals, new title "shell eggs" appeared).

Processed raisins, second revision, page 3624, Apr. 24 *Federal Register*, effective May 24.

(*Turn to page 203*)

A NEW ADVERTISING MEDIUM...

Another

RHEEM FIRST!

Rheemcote Poster Drums
beautifully lithographed in multi-colors
for ROHM and HAAS

This colorful 30-gallon steel shipping container, designed by Rohm & Haas for Dithane, an agricultural fungicide, was produced by Rheem on the world's largest metal decorating presses. This is the first large steel container printed by four-color process lithography.

This drum does double duty! It serves both as a sturdy shipping container and as an attractive display.

Rheemcote poster drums can be lithographed with any design in any number of colors to provide powerful advertising, plus family identification for all your containers, large or small.

For more information, write—Rheem Manufacturing Company, General Sales Offices, 570 Lexington Ave., New York 22, N. Y.

RHEEM

World's Largest Manufacturer of Steel Shipping Containers

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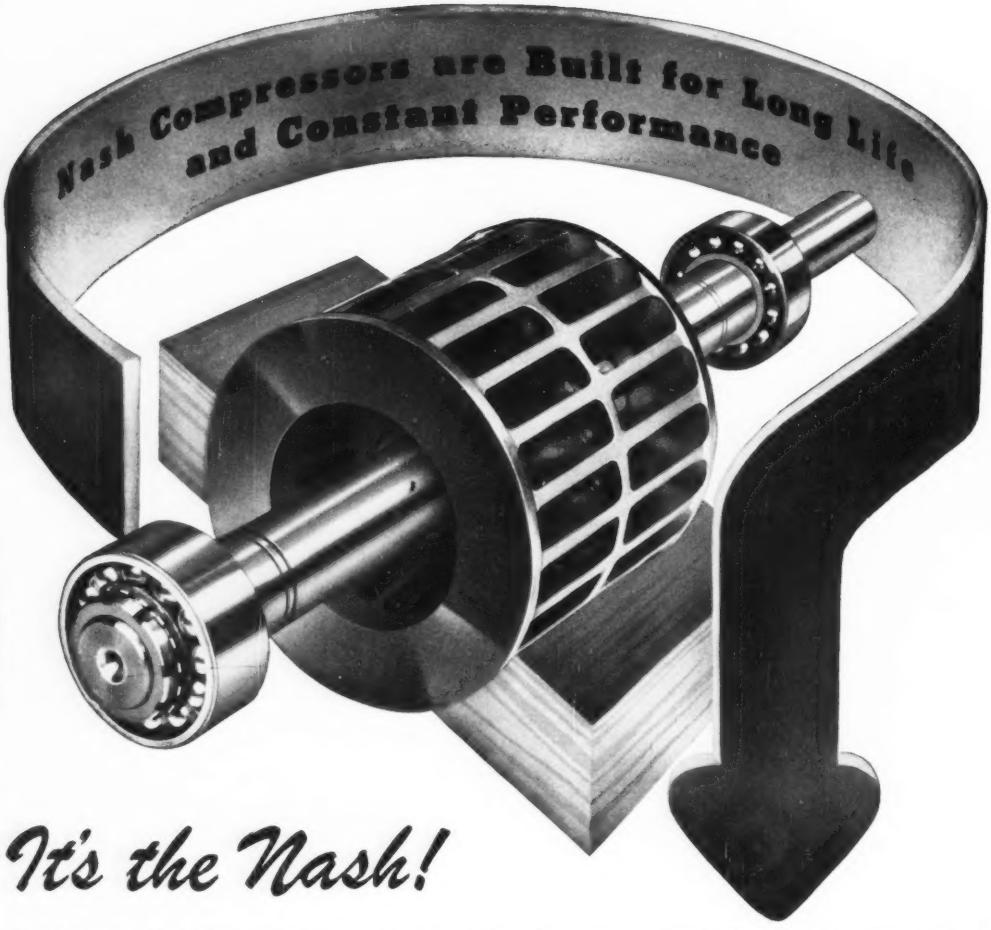
RHEEM MFG. CO.

SELL AS YOU SHIP WITH

RHEEMCOTE DRUMS

Rheem Manufacturing Plants in 22 Cities Around the World



It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY

312 WILSON, SO. NORWALK, CONN.

Schedule of Events

June

16–July 3—Short course in food technology; Massachusetts Institute of Technology, Cambridge, Mass.

24–26—American Dairy Science Assn., annual meeting; Davis (Calif.) Campus, U. of California.

25–28—National Macaroni Manufacturers' Assn., annual convention; Montreal, Canada.

July

21–26—Industrial Microbiology Institute, fifth annual short course; Purdue U., Lafayette, Ind.

August

4– 6—International Apple Assn., 58th annual convention; Hotel Jefferson, St. Louis.

12–14—Western Packaging & Materials Handling Exposition; Shrine Convention Hall, Los Angeles.

Poultry and edible products thereof, grading and inspection regulations, revised, page 3627, Apr. 24 *Federal Register*, effective Apr. 24 ("upon publication").

Dairy plant inspection regulations, proposed revision withdrawn for further study, page 3746, Apr. 26 *Federal Register*.

Butter, proposed revision postponed "until the 1952 'in-and-out' of storage movement of butter has been essentially completed", page 3746, Apr. 26 *Federal Register*.

F&DA Food Standards

Food & Drug Administration hearing on *canned pineapple* fill of container required two days in late April, having adjourned from the November 1951 session on other phases of standards activities on this commodity.

Statistical data are still to be filed, with briefs due sometime in August. Next step will be issuance of a tentative order, probably during the fall months.

Ice cream hearing continued, with an additional five weeks or so still expected at time of writing in early May. (The time-consuming cross-examination of witnesses on harmlessness of surface-active agents has led an observer to liken this hearing to the Korean truce negotiations!) After cross-examination, general testimony by F&DA and by others will be heard before the hearing closes.

Supreme Court agreed in early May to hear the Cardiff case, in which F&DA inspectors were barred from a food plant when its management decided not to grant permission for entrance and inspection. (See p. 200 Apr. FE.) It is unlikely that the case will be heard before the October term.

ESTABLISHED 1851

Morningstar

A *DEPENDABLE SOURCE* FOR FOOD STARCHES AND THICKENING AGENTS

More and more Food Product Processors from coast to coast are depending upon MORNINGSTAR for Food Starches and Thickening Agents. Direct importers and manufacturers, MNI can ship quickly and economically in any quantities from a few 100 pound paper bags to many carloads. MORNINGSTAR BRAND Products are scientifically prepared and laboratory controlled to precise standards of *uniform* fine quality. They'll add new texture and appeal to many foods.

POTATO STARCH . . ARROWROOT FLOUR
TAPIOCA FLOUR . . LOCUST BEAN GUM
SOLUBLE STARCHES AND DEXTRINES

WRITE US—TELL US ABOUT YOUR NEEDS!

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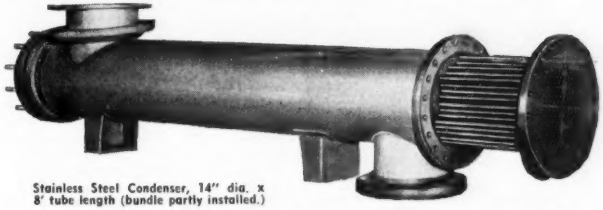
DOWNINGTOWN IRON WORKS INC

We are specialists in
HEAT TRANSFER EQUIPMENT



Stainless Steel Condenser, 14" dia. x 8' tube length (bundle partly installed.)

DOWNINGTOWN solicits your inquiry for Heat Transfer Equipment fabricated of Aluminum, Inconel, Nickel, Phosphor and Aluminum Bronze, Copper, Stainless, Monel, Silicon Bronze and various grades of Carbon Steel.
Design and construction will meet requirements of A. S. M. E. Code or other agency specified by customer. Equipment of our design is sold on a guaranteed performance basis or we will fabricate to customer's drawings. Modern Facilities available for radiographing, stress relieving and heat treating, where required.
Remember: "Your Needs Are Our Specialty!"
DOWNINGTOWN is experienced in building equipment with Bi-metallic, Finned Tube and Karbate Graphite.
Write on your letterhead for DOWNINGTOWN literature on shell and tube heat exchangers

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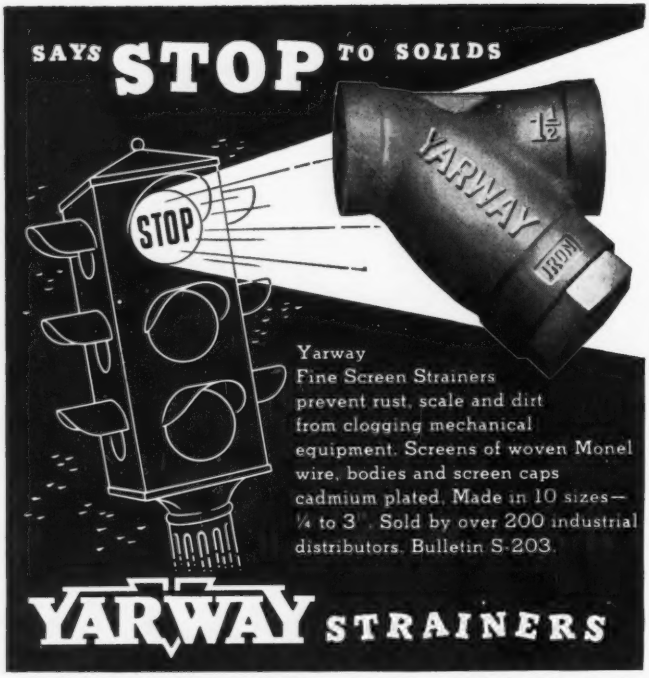
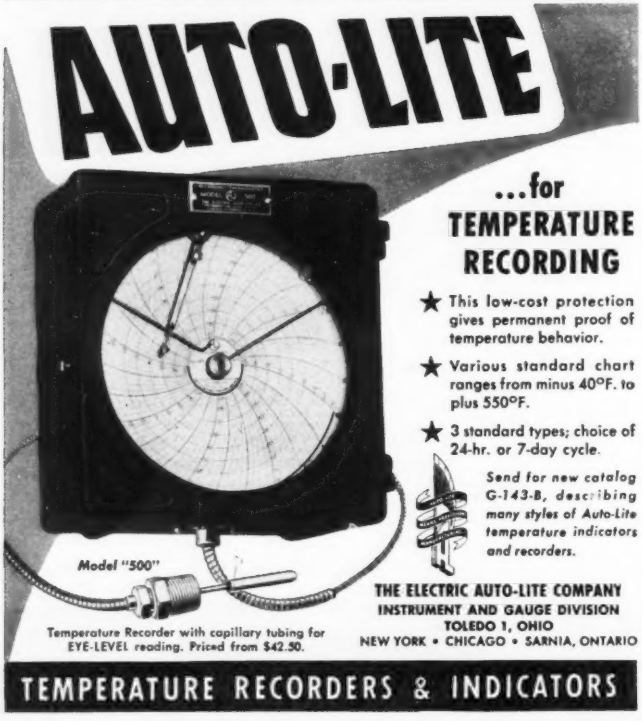
DOWNINGTOWN, PA.
STEEL & ALLOY PLATE FABRICATION
HEAT EXCHANGERS

NEW YORK OFFICE: 30 CHURCH STREET

For more information, use post card on last page.



YARNALL-WARING CO., 127 Mermaid Ave., Philadelphia 18, Pa.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...for
TEMPERATURE
RECORDING
★ This low-cost protection gives permanent proof of temperature behavior.
★ Various standard chart ranges from minus 40°F. to plus 550°F.
★ 3 standard types; choice of 24-hr. or 7-day cycle.
Send for new catalog G-143-B, describing many styles of Auto-Lite temperature indicators and recorders.
Model "500"
Temperature Recorder with capillary tubing for EYE-LEVEL reading. Priced from $42.50.
THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO
TEMPERATURE RECORDERS & INDICATORS

Fully Conditioned Plant

—*Continued from page 166*

installed if desired. This can result in a substantial saving in operating expense, because the input fuel requirement is reduced directly with load requirement, there being practically no distribution or standby losses.

Several of the heaters were incorporated as integral parts of the air conditioning system. In these cases, the standard internal fans of the heaters were removed because the air conditioning system fans furnish the necessary air.

Each heater is designed with a stainless steel combustion chamber, which enables rapid transfer of heat to the air. The use of stainless steel also eliminates the problem of corrosion from moisture laden air passing over the outside heating surface of the combustion chamber during the cooling cycle.

End (*Resume reading on page 93*)

Frozen-Fruit Quality

—*Continued from page 129*

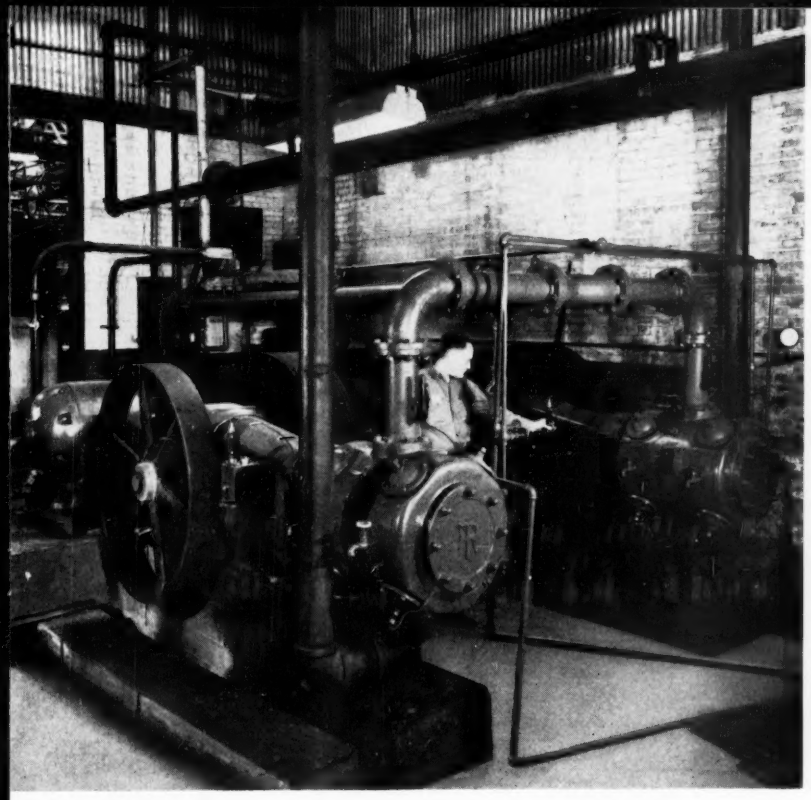
William E. McIntosh, company president, and Louis Schult, vice-president and plant manager, designed the small but effective blanchers. The equipment has proved so efficient that a large equipment manufacturer has adopted the design.

For quick cooling of the apple slices, each blancher discharges into a two-stage cooler: The blancher dumps the slices into a trough into which runs 68 deg. F. city water. Then an endless stainless-wire belt moves the slices out of the trough and through a chilled-water spray chamber. The same belt also serves to drain the slices before they are inspected and canned.

Blast Does It

Since all the fruits packed at McIntosh's go into hard-to-cool 30 lb. tins, quick-freezing posed quite a problem for this small plant. It has been successfully licked, however, with a design by H. S. Chapman, Rochester, N. Y.

The unit (see drawing) is divided into three sections—the first a 20x20 ft. room held at zero and used for receiving and prechilling. The second room, locally nicknamed "the blast," operates between −20 and −30 deg. F. Air is drawn through a vertical ammonia coil situated next to one of the walls of this 16x41 ft. room,



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Compressors give carbon the air

• When carbon formed on the valves of these air compressors and the oil in the crankcases had to be changed frequently, operators of this Midwest plant called in a Standard Oil lubrication specialist. He recommended STANOIL Industrial Oil, a multi-purpose oil having a low carbon-forming tendency and containing effective oxidation and corrosion inhibitors. With STANOIL, the compressors gave the air to carbon troubles and have breezed through four years of hard operation without difficulty. Over the oil previously used, STANOIL has given four times longer service in the crankcases. These results . . . similar to the results you may expect . . . have led to the use of STANOIL in other equipment in this plant.

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Find how this multi-purpose oil can benefit you by discussing it with a Standard lubrication specialist. You can contact him by phoning your local Standard Oil office.

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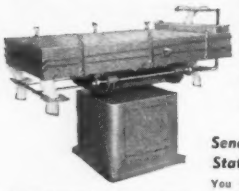

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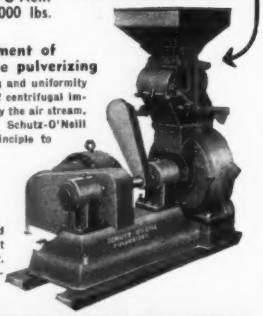

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then is carried across a false ceiling and goes down and around the 30 lb. tins. Freezing is complete in less than 18 hr.

A third 20x20 ft. area is used for storage preparatory to shipment by refrigerated truck.

"The blast" requires 50 tons of refrigeration, while the receiving room uses 5 tons. Fortunately, the company is located adjacent to an ice-making plant, from which it can buy direct-expansion ammonia for its refrigeration.

Equipment versatility and foresightedness in the plant layout have paid off. Preparation procedures with apples, cherries, peaches, and strawberries differ, so by necessity the units required for each of these processes can only be used for one item. However, the conveying, ice-water pre-chilling, inspecting, and canning steps are handled on common equipment.

Quality Accented

Centrally located inspection tables receive fruit from the coolers, which follow the blanchers. Peach halves, and hulled and sliced strawberries can easily be fed from the preparation room to the cooler and thence to the same inspection tables used for apple slices.

All the products are hand-canned in the same area, but the sour cherries can be completely processed on separate lines if desired.

Close quality control is a fundamental operating policy at the plant. Careful checks are made of blanching times and temperatures, cooling temperatures, net and drained weights, puncture tests, and sugar ratios. Workers' skills are also taken into account.

In addition, the USDA has an inspector on the premises during processing to look into the condition of the raw fruit, sanitation, and methods of handling. McIntosh's quality control is under the direction of Clarence Kunz, company secretary.

The strawberry operation can be used as an example of how quality-minded the company is. Normally, production is restricted to one daytime shift. But when berries are in season, the crews arrive after their evening meal and get the quick-spoiling fruit canned quickly and into the freezer. This eliminates the usual overnight holdover and resultant deterioration.

The management is also just as much on its toes when it comes to research and development. For example, it is currently engaged in a program to produce ready-to-bake frozen pastries—using company fruit materials as fillers.

End (Resume reading on page 131)

Over 80 years ago, John Herman Pine first recognized, through self-treatment of a throat irritation, the demulcent . . . emollient . . . and hygroscopic properties of U.S.P. Glycerine. Today, Glycerine and Pine Bros. are virtually synonymous to a large segment of the general public . . . and consumer interest and acceptance is steadily increasing, as reflected in years of continuous sales increases.

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U.S.P. Glycerine serves the manufacturer of pastilles, confections and foodstuffs in a variety of ways! For instance, it acts as an ideal vehicle and blending agent for the five flavors that now make up the Pine Bros. family. Each tablet is uniform in appearance . . . uniform in taste! And versatile Glycerine—blended with Acacia, flavoring and other components—serves as a natural sweetener as well!

U.S.P. Glycerine, as a solvent and extractant for base flavors, is widely favored by extract manufacturers. It adds smoothness to mixtures . . . and distributes flavors uniformly. Even in the field of packaging materials, Glycerine has come to be an important component of wraps that come in contact with food products.

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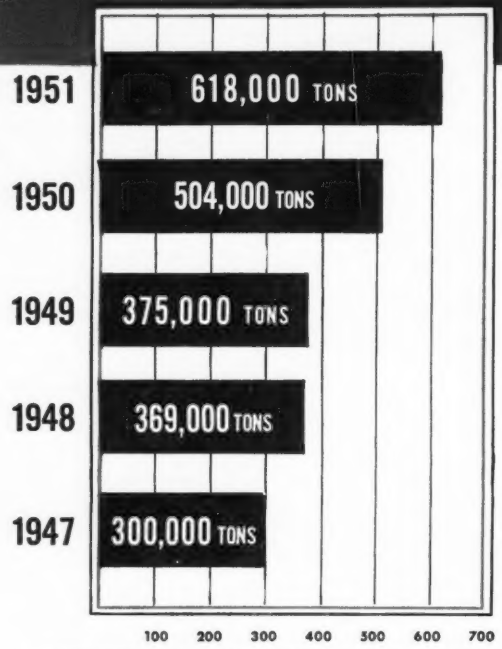

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PIONEERS IN LIQUID SUGAR FOR SAVINGS, SANITATION AND SERVICE

Dessert Wine Progress

—*Continued from page 100*

nate shock caused by interrupted wine flow at the 40 psi.

Cases of bottles are received at this plant on pallets. All warehousing operations are by fork lift trucks—three battery powered electric units, one gasoline powered unit, and one small electric hand truck.

The mechanical standardization of the bottling room equipment materially reduces the maintenance problem as well as change-over time.

Stillage Disposal

Stillage disposal is a major problem confronting the California wine industry, and it is especially difficult to solve because of the seasonal nature of the operations and the strength of wastes involved.

Conventional sewage disposal, while applicable to whiskey distillery practice and the handling of liquid wastes from brewing operations, fails to work effectively in this case without considerable modification. Some progress has been achieved, however, in developing the proper modification.

Winery stillage contains a low percentage of solid matter, but it is rather high in soluble solids content. Pilot plant trials have indicated the unfeasibility of biofiltration procedure without considerable pre-treatment based upon decreasing its strength. Chemical treatment to precipitate all, or part of, the soluble material offers the most economical means of accomplishing this objective.

Chemical treatments tried to date only partially remove the soluble materials. The stillage following such treatment remains many times stronger than domestic sewage in biological oxygen demand. Anerobic digestion of the remaining solubles appears to be required before biofiltration can be employed successfully.

Conventional practice puts the stillage onto land prepared to accept it in shallow basins. Rotation of the basins permits disposal of rather large volumes of stillage at a minimum land requirement and with a maximum freedom from undesirable odors.

Despite these advantages, the procedure is considered as a "stop-gap" prior to finding one based upon sounder scientific practices designed to meet the economic considerations and the encroachment of residential developments around the existing winery properties.

An approach to the problem has been made at the Italian Swiss Colony Winery. Here, the stillage is piped from the distillery to a series of five shaker-screens, where the greatest part of the suspended solids are removed. Solids are conveyed to an expeller-type screw-press, from which the press liquor is returned to the screened liquid. Press cake is conveyed to a dump to be used as stock feed.

Screened liquid is treated with a lime slurry as it emerges from the screening system and flows, by gravity, to a "V" weir into a flocculating basin. This basin is equipped with under-surface agitation to effect complete solution of the lime and facilitate the flocculation of the colloidal materials.

Treated liquid flows into a sedimentation basin, where the flocculated colloids and precipitable material are collected. These latter materials are removed by a drag-conveyor and are slowly moved to a sump situated at one end of the basin. A flight conveyor removes the material from the system, and it is pumped to shallow land basins for air-drying. The liquid is pumped to land disposal basins.

End (*Resume reading on page 101*)

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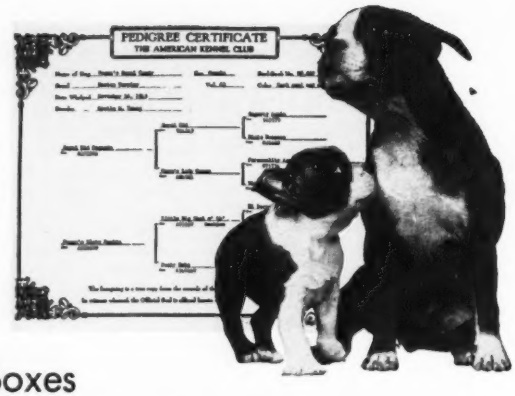

The Boston Terrier was bred in Boston about sixty years ago from English Bulldog and white English Terrier stock. This little fellow is exceptionally lively and bright, and truly deserves the title of "American Gentleman."

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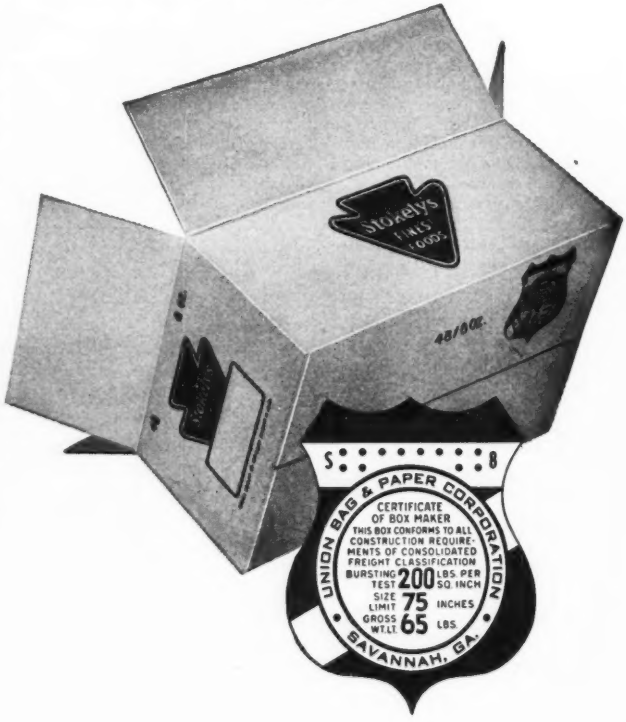
That's why, every month, more famous national-brand products are shipped in Union boxes.



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PRODUCTS

Animal Feeds From Spent Hops by Grinding, Mixing With Stock Feed, Pressing and Drying—*J. A. Siefker, St. Louis, and J. F. Brasch, Clayton, Mo. to Anheuser-Busch, Inc., St. Louis.* No. 2,592,348. *April 8, 1952.*

Coagulation Resistant Cream-Style Corn Comprised of a Solid Kernel Component and Cream Fraction Which Contains Small Quantities of Halogen-Treated Corn Starch—*R. A. Whitmore, Saratoga, and F. D. Hickey, Mountain View, Calif. to Food Machinery & Chemical Corp., San Jose, Calif.* No. 2,592,988. *April 15, 1952.*

Potato Juice Made by Freezing Potatoes, Thawing, Expressing Juice, Heating to Separate Heat Coagulable Constituents, Separating Precipitate—*E. G. Heisler and R. H. Treadway, Philadelphia, to U.S.A.* No. 2,594,308. *April 29, 1952.*

Concentrated Pectin Jelly Composition Which Forms Edible Dessert Jelly by Dissolving in Hot Water and Cooling—*G. L. Baker, Newark, Del. and M. Oliver, Histon, Cambridge, England, to Chivers & Sons, Ltd., Histon.* No. 2,594,439. *April 29, 1952.*

Clear Demineralized Syrup Containing Sucrose and Invert Sugar by Clarifying and Decolorizing High Density Syrup, Then Passing Through Acid Regenerated Cation Exchanger at High Temperature, Cooling, Passing Through Anion Exchanger—*M. F. Hughes, Jersey City, N. J., and M. A. McCalip, Yonkers, H. S. Paine, Dobbs Ferry, and N. Rosenberg, to Refined Syrups & Sugars, Inc., Yonkers, N. Y.* No. 2,594,440. *April 29, 1952.*

Caramelized Confectionery Product Made From Fruit Pulp and Juices by Passing Thin Layer of Material Over Heating Surface at 80-160 deg. C. While Air-Cooling Outer Surface—*J. Braeback, Copenhagen, Denmark to Aktieselskabet "Volund", Copenhagen.* No. 2,594,538. *April 29, 1952.*

Flavoring Materials Made by Passing Hydrogen Sulfide Through Solution of Carbonyl Compound and Cycohexanone in an Aliphatic Ester of a Hydroxypolybasic Acid —*W. E. Barch, to Standard Brands Inc., New York City.* No. 2,594,739. *April 29, 1952.*

Stock Food From Citrus Waste by Shredding, Treating With Alkaline Compound, Adding Preservative, Storing in Enclosure, Expressing to Reduce Moisture Content—*D. B. Vincent, Tampa, Fla.* No. 2,595,181. *April 29, 1952.*

PACKAGING

Machine for Automatically Wrapping Butter and the Like in Parchment—*H. R. Coon, Sr., and E. J. Rapp, to Lynch Package Machinery Corp., Toledo, Ohio.* No. 2,592,793. *April 15, 1952.*

Device for Packing Poultry Into Suitable Shipping Containers Directly From Washing and Grading Bins Consisting of Plurality of Paper Dispensing Rolls That are Slidable Along Bin-Bearing Table —*R. V. Mathews, Ottumwa, Iowa, to Swift & Co., Chicago.* No. 2,593,325. *April 15, 1952.*

PROCESSES

Cooking and Canning Ground Meat Patties by Passing Under Infra-Red Radiation, to Semi-Cook and Harden, Inverting and Exposing Other Side, Canning and Sterilizing—*J. Hoffman, New York, and A. Gruff, Flushing, N. Y. to Claridge Food Co., Inc. Murray Hill, N. Y.* No. 2,584,584. *Feb. 5, 1952.*

Preparing Tortilla Flour by Steeping Whole Corn in Water Containing Excess Lime at 100 deg. C., Grinding, Drying Below Starch Gelatinization Temperature to Less than 14 Percent Moisture—*W. R. Lloyd, Austin, Tex., and R. M. Sotres, Mexico City, Mexico to Armour Research Foundation of Ill. Inst. of Technology, Chicago.* No. 2,584,893. *Feb. 5, 1952.*

Treating Egg Whites by Fermenting With Streptococcus Lactis in Non-Proliferating State—*A. M. Kaplan, Hyattsville, Md. and M. Solowey, Washington, D. C. to U. S. A.* No. 2,585,015. *Feb. 12, 1952.*

Processing Grain by Applying Emulsion of Water and Mineral Oil Within Range of 0.02-0.08 Percent Based on the Weight of the Grain—*R. Moen and M. S. Dalquist, to General Mills Inc., Minneapolis.* No. 2,585,026. *Feb. 12, 1952.*

Treating Cheese Prior to Curing by Applying An Antibiotic Solution to Surface and Drying Surface—*L. L. Rusoff and A. J. Gelpi, Jr. to Board of Supervisors, Louisiana State University, Baton Rouge, La.* No. 2,585,501. *Feb. 12, 1952.*

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Stabilized Brown Rice Prepared by Subjecting Undried Grain to Hot, Moist Gas to Blanch, Drying to 10-15 Percent Moisture, Hulling—*G. R. Van Atta, E. B. Kester and H. S. Olcott, Berkeley, Calif., to U. S. A. No. 2,585,978. Feb. 19, 1952.*

Diacetyl Prepared From Milk by Inoculating With Streptococcus Diacetylactis, Incubating 12 hr. at 75-80 deg. F. Until Titratable Acidity of About 0.55 Percent is Reached—*M. W. Marcoux to Armour and Co., Chicago. No. 2,586,072. Feb. 19, 1952.*

Preserving Foodstuffs Which are Subject to Attack of Fungi by Incorporating Gallic Acid Ester of Aliphatic Alcohol of 8-12 Carbon Atoms—*F. D. Tollemaar, Utrecht, Netherlands to Nederlanse Centrale Organisatie voor Toegepast Naturwetenschappelijk Onderzoek, The Hague, Netherlands, No. 2,586,274. Feb. 19, 1952.*

Continuous Method of Making Clearly Defined Markings on Chocolates, Caramels, Icings, etc. by Passing Them in Plastic State Under Device Employing Moving Jets of Air Which Indents the Surface According to Predetermined Pattern—*J. P. McNamara, Dunedin, New Zealand ½ to Romisons Confectionary Ltd., Dunedin, New Zealand. No. 2,586,684. Feb. 19, 1952.*

Making Bakers Cheese by Coagulating Milk, Cooling Below 65 deg. F., Pumping Through Filter Press, Passing Cool Water and Cool Air Through Press, Removing Curd—*M. M. Kloser, and O. J. Shenk, Chicago, and T. L. Kimball, Park Ridge, Ill. to Bowman Dairy Co., Chicago. No. 2,586,830. Feb. 26, 1952.*

Lubricating Meat Conveying Apparatus by Immersing in Molten Paraffin Wax, Oil, and Microcrystalline Petrolatum Wax —*W. F. Weber, to Armour and Co., Chicago. No. 2,587,017. Feb. 26, 1952.*

Continuously Crystallizing Sugar by Stepwise Cooling Saturated, Seeded Solution Under Increased Vacuum and Reduced Temperature—*G. H. de Vries, Hilversum, Netherlands to Werkspoor, N. V., Amsterdam, Netherlands. No. 2,587,293. Feb. 26, 1952.*

Emulsifying Prepared Ice Cream Mixes by Adding Ester of High Fatty Acid and Polyhydric Alcohol After Mix is Pasteurized and Cooled—*N. H. Nash, Bronx, N. Y. to Lanco Products Corp., New York City. No. 2,587,369. Feb. 26, 1952.*

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Canning Peppers by Direct Contact of Diced Product With Live Steam, Draining, Filling Into Can, Covering With Aqueous Solution of Edible Organic Acid, Sealing, Cooling—*R. W. Harris to H. P. Cannon and Sons, Inc., Bridgeville, Del. No. 2,587,466. Feb. 26, 1952.*

Continuous Process for Producing an Extra-Sweet Syrup From Corn Starch by Acidifying Starch Suspension, Heating to Hydrolyze, Adding Readily Hydrolyzed Carbohydrate, Neutralizing, Refining and Concentrating—*J. E. Cleland, Granite City, Ill. to Union Starch and Refining Co., Columbus, Ind. No. 2,587,596. Mar. 4, 1952.*

Method of Defatting Starch by Contact With Hydrophilic Fatty Acid Solvent at 105-125 deg. C. and 1-6 Atmospheres Pressure—*C. E. Rist, H. A. Davis, and I. A. Wolff, Peoria, Ill. to U. S. A. No. 2,587,650. Mar. 4, 1952.*

EQUIPMENT

Can Aligning Machine With Turning Member Deposed Above Conveyor Feeding Delivery Station—*E. R. Dudley, Jr., San Jose, Calif. No. 2,586,523. Feb. 19, 1952.*

Perishable Cargo Refrigerating Compartment Comprising Double-Insulated Wall Enclosure With Means for Controlling Circulation of air From Refrigeration Medium —*L. L. Westling, Oakland, Calif. No. 2,586,893. Feb. 19, 1952.*

Apparatus for Injecting Curing Solution Into Meat—*F. J. Avery, La Grange, Ill. No. 2,587,024. Feb. 26, 1952.*

Positive-Feed Confection-Freezing Apparatus With Funnel Delivering Fluid Mix to Freezing Cylinder by Pump Pressure—*C. Erikson and E. Spellman, New York City. No. 2,587,127. Feb. 26, 1952.*

Food Dehydrating Apparatus Consisting of Closed Vessel Operating Under Vacuum Containing Plurality of Receptacles Supplied With Hot Processing Liquor From External Heating Tanks—*W. A. Webb, San Jose, Calif. No. 2,587,939. Mar. 4, 1952.*

Extruding Screw Press for Macaroni—*L. Barbiere, Parma, Italy. No. 2,588,196. Mar. 4, 1952.*

Apparatus for Stunning or Killing Animals Without External Evidence of Injury Comprising Air Tight Chamber Connected to Series of Tanks for Automatically Pumping off Fluid From Chamber—*L. E. Sadler, ½ to B. R. Bently, Los Angeles, Calif. No. 2,588,770. Mar. 11, 1952.*

Machine for Slicing and Coring Fruit on Continuous Belt With Carrying Cups Employing Vertical Reciprocating Halving Blades and Movable Drill Adapted to Remove Core—*E. Altman, Valdosta, Ga. No. 2,588,790. Mar. 11, 1952.*

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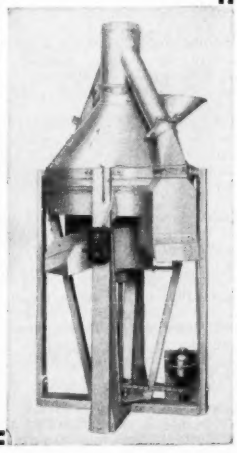
WHAT DO YOU WANT TO SEPARATE FROM WHICH?

Made in eight models, Bauer Specific Gravity Separators are used for cleaning grains, seeds and peanuts; for segregating corn germs and grits; for classifying and processing puffed and flaked cereals, fibrous materials, hulls, etc.; for separating tree nut meats from shells and debris.

Some of the models are equipped with stoners to remove metal, glass, and pebbles. All can be equipped with Bauer magnetic separators to remove tramp iron.



Through pneumatic and mechanical action, the Specific Gravity Separators classify materials according to apparent densities. The machines are so versatile that they have countless applications to the cleaning or separating of dry substances.

Ask for literature and data

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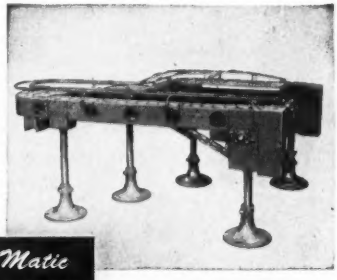
Reduce Handling Costs!



Styl-O-Matic
LATERAL CURVE
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KEEPS PRODUCTION FLOWING SMOOTHLY

A VERSATILE, economical unit for the food, dairy, beverage, etc. field. Conveys in straight line, around curves (0° to 180°) and up or down normal inclines or declines. Available in steel or stainless steel, with or without pack-off tables. Only one power unit is needed as there are no corner brackets.

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about this flexible, smooth operating unit that lowers costs and increases production. Ask for Bulletin No. ST-1. Dept. FE-6.

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CUT CASE SEALING COSTS UP TO..65%..

Actual field tests show that 109 BOX-WELD'S extra speed, amazing mileage, and ability to handle a great variety of cases, has cut case sealing costs as much as 65%! It is consistently out performing even expensive resin emulsions in many cases. New 109 BOX-WELD is ready to use, NEVER requires dilution. It bonds fast (15 to 20 seconds compression) even on tough, springy flaps . . . works equally well on machine or by hand . . . on all types of cases.

You Save 5 ways

- Low initial cost
- Permits increased speed
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A PREMIUM PRODUCT AT A COMPETITIVE PRICE!

On a price-performance basis No. 109 BOX-WELD challenges comparison. Get the facts now. Write for results of field tests and a sample lot.

No. 109 BOX-WELD is a product of The F. G. Findley Company. Manufactured for distribution on the east coast by the Union Paste Company, Hyde Park, Massachusetts.

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sales offices in CHICAGO, KANSAS CITY, NEW ORLEANS, DALLAS, HOUSTON, MINNEAPOLIS, ST. LOUIS, KALAMAZOO, LOUISVILLE AND OGDEN, UTAH.

THE F. G. FINDLEY COMPANY • W. PEMBERTON AVE. • MILWAUKEE 45, WIS.

Men & Companies

Frank Kobe is now director of research for Rockwood & Co., maker of chocolate.

Industry

Canada Dry Lexington Co., Lexington, Ky., has begun operation in bottling and distribution. Its capitalization: $100,000.

Carl Cannon Co. now operates a distilled vinegar packing plant in Vidalia, Ga. Capacity per day: 1,500 gal.

Coca-Cola Bottling Co., Inc., will construct a plant at Spokane, Wash. Cost: $200,000.

Columbia River Packers' Assn. has installed a quick-freezing plant to process fish fillets in Astoria, Ore. Capacity: 1,100 lb. per 45 min.

Conte & Sons Packing Co., canner of pizza sauce and mashed tomatoes, is building a new plant at Palm, Pa. Operation date: Late fall.

Four Percent Co., Detroit, will shortly be making flavors, extracts, syrups, and beverage bases. Capitalization: $50,000.

Gulf Coast Rice Farms, Houston, Tex., has acquired the Comet Rice Mills of Beaumont, Tex. Estimated price: $3,000,000.

Maratori Macaroni Co., Thorold, Ont., had its plant gutted in a recent fire. Loss: $300,000.

Narragansett Brewing Co., R. I., has negotiated with Croft Brewing Co., Boston, to acquire certain Croft assets and a long-term lease of its plant.

Oklawaha River Processing Co-Op. and B. & W. Canning Co., both of Florida, announce their merger. The two handle a total of 5,000,000 boxes of citrus annually.

Pillsbury Mills has entered Canadian market by merging Copeland Flour Mills, Ltd., Ont., and Renown Mills Ltd., Alta.

RCO Frozen Foods has started operations at Bayamon, Puerto Rico, to supply frozen crab meat to the U. S.

Rosenberg Bros. & Co., Inc., processor of rice, nuts, and dried fruit, intends expanding its rice production at Biggs, Calif.

Personnel

Charles D. Alhadeff, Seattle, is new president of the National Fisheries Institute. He succeeds Royal Toner of New York.

J. D. Anderson, Atlanta, was elected president of Southern Coffee Roasters Assn., succeeding John R. Pepper, Memphis.

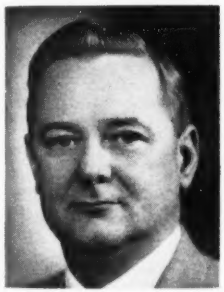
L. A. Bomel has been named chairman of National Dairy Products Corp.

Pat Cagle, Texas nut shelling plant operator, is now chairman of the National Peanut Council.

Jodean P. Cash, Miami, has been elected president of Fuchs Baking Co. T. J. Faust is secretary-treasurer, with R. J. Faust as his assistant.

George H. Coppers, president of National Biscuit Co., has been elected president of the New York State Chamber of Commerce.

R. H. Cronshey, Los Angeles, was elected president of Pa-



Charles W. Kaufman, present executive director of research for Kraft Foods Co., has been named a vice-president.

MORE PROFIT ← → THROUGH THE USE OF ECONOMICAL EQUIPMENT

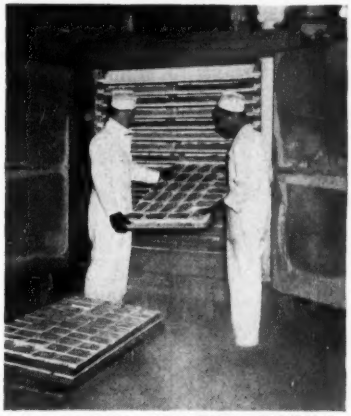
Amerio CONTACT PLATE FREEZERS

(Patent Applied For)

FOR QUICK ECONOMICAL FREEZING

Cost Conscious Processors are switching to "Amerios". Power consumption per pound of product is lower. Maintenance costs are practically zero.

Economy gives a real profit edge in today's competitive and price-conscious markets.



Economy is only part of the "Amerio" story. Quick freezing means full flavor and quality retention. This provides constant consumer satisfaction.

The flat, uniform packages provide stable stacking in the dispensing units.

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Designed For Ammonia, Brine or Freon Refrigerant

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Union City, N.J.
"It's the Contacts that Count"

Send For New, Illustrated Brochure

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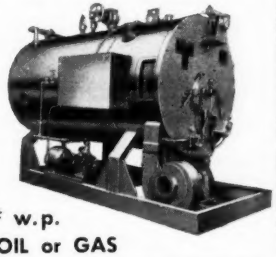
After Installing . . . Our LOCAL Service Man Starts Unit and Provides Three Months Free Service



10 to 500 h.p.
15# to 200# w.p.
OIL or GAS

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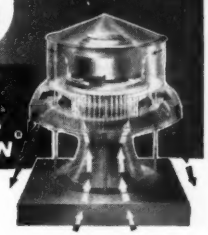

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Performance Ratings CERTIFIED by an independent laboratory. Cap: 150-11,000 CFM: Static Pressures to 1¼".

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Damp-Tex, widely known as The Wet Surface Enamel, is your most reliable, economical method of transforming dingy, damp, unsanitary surfaces into lasting porcelain-like beauty at low cost.

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Canadian Manufacturer
STANDARD PAINT & VARNISH CO., WINDSOR, CANADA
Canadian Industrial Distributor
G. H. WOOD & CO., LTD., TORONTO

C. W. Cook has been promoted to post of sales and advertising manager of General Foods' Maxwell House Div.

cific Dairy & Poultry Assn. at its recent convention.

Dr. R. L. Cushing has been named president and director of the Hawaii Pineapple Research Institute. He succeeds Dr. E. C. Auchter.

John Morrell Foster has been named president and chief executive of John Morrell & Co., Iowa meat packing concern. His brother, George M. Foster, becomes board chairman.

Harry W. Guppy, western division manager of Planters Nut & Chocolate Co., has been recently appointed a board director.

Hank Klug will be food instrument specialist for M. M. Baker & Co., Omaha, new consulting firm dealing with automatic controls for food plants.

Dr. Romeo R. Legault has been named professor of food technology in the Univ. of Ill. College of Agriculture.

Edmund Littler, Jr., succeeds Edmund Littler, Sr., as president of Walter M. Lowney Co., Ltd., maker of candy products.

Dr. Roy C. Newton, research vice-president of Swift & Co., has received the 1952 Industrial Research Institute award for outstanding research leadership.

William H. Stanton is now general manager of Campbell Soup Co., Ltd., Ont.

Edward C. Steele will succeed Louis F. Long as general manager and vice-president of Red Wing Co., Dunkirk, N. Y., meat packing firm.

G. S. Suppiger, Jr., is new secretary of G. S. Suppiger Co., maker of catsup. He continues also as purchasing director.

F. C. Talbot has been named a director of Wieland's Brewing Co., San Jose, Calif.

Albert E. Tolley is now vice-president in charge of plant operations of General Baking Co.

Associate Industry

R. C. Can Co., maker of fiber containers has begun construction of a new plant in St. Louis.

Chase Bag Co. announces appointment of Walter J. Wilks as manager of its Ohio paper mill.

Chicago Metal Hose Corp., maker of thermostats, bellows, control devices, and flexible metal hose and tubing, has changed its name to Flexonics Corp.

Continental Can Co. of Canada, Ltd., will build a plant at Burnaby Lake near Vancouver, B. C. Cost: $2,500,000.

Damascus Tube Co., Greenville, Pa., has made W. H. Lagerstrom general manager. Company makes stainless steel tubing and pipe.

Fletcher Mfg. Co., Ltd., Ont., has purchased an additional building to facilitate expansion of food machinery production.

Robert Gair Co., Inc., has acquired American Coating Mills Div. of Owen-Illinois Glass Co. The division's '51 net sales: $20,000,000.

Lynch Corp. re-elected its seven directors recently and made Russell L. Sears a vice-president.

Marathon Corp., Menasha, Wis., maker of packages and packaging material, has made John Stevens, Jr., president, and Leo E. Croy and Roy J. Sund vice-presidents.

B. D. Graham is new general sales manager of the H. J. Heinz Co. He replaces J. B. Holcomb, who is retiring.

Continental

PACKAGED AUTOMATIC BOILERS

The Continental Automatic Boiler is easily installed at low cost. With a guaranteed high operating efficiency, it assures you continuing savings year after year. Steam moisture content at less than 1% is proven by independent laboratory tests. Fully automatic, the Continental assures a high heat transfer with resultant low gas temperature at the stack. No furnace refractory makes possible easy access to front and rear of boiler through hinged doors. Economically burns oil, gas or combination. Some sizes carried in stock. Details and specifications gladly sent on request. Write today!

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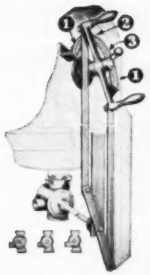
Manavon Street • Phoenixville, Pa.
40 Years of Boiler Experience

DON'T LOSE PROFIT DOWN THE SEWER!



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Stop wasting valuable product. Langsenkamp three-way valve provides positive one-point control. Eliminates loss of product by accidental releasing of old time tank plug, and prevents possibility of back pressure lifting plug permitting raw stock entering filler line.

Install Langsenkamp 3-way valve . . . supplies positive one-point control and saves time as well.

Position #1—All positions closed.
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Position #3—To waste line.

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● It describes and illustrates all models Bin-Dicator bin level indicators for thin or thick walled bins, inside or outside location and suspended interior installation in tanks, silos, hoppers and bins. Also describes Bin-Flo Aerator for keeping pulverized materials moving. Many wiring diagrams. Write for this helpful new catalog.

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13946-R Kercheval • Detroit 15, Mich.

AMERICAN SPICE TRADE ASSOCIATION
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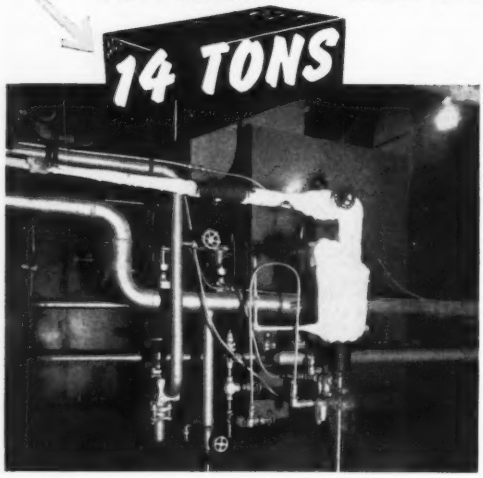
YOU'RE GETTING ALL THE FLAVOR WHEN YOU BUY NATURAL SPICES!

All elements in natural spices contribute to the fine flavor of your product, because no flavor-bearing element is discarded or lost in grinding and processing. Every bit of natural goodness is still there, protected by the antioxidant qualities of spice cells and fibers, with no loss or alteration of the original fine spice flavor.

ARMSTRONG PURGER UPS REFRIGERATION CAPACITY



At Velvet Freeze, Inc., Ice Cream . . .

VELVET FREEZE, INC., Kansas City, uses an Armstrong Forged Steel Purger to keep their system free of air and other non-condensables and it is paying off handsomely. The purger has reduced head pressure 30 lbs. Since each 4 lbs. excess head pressure reduces capacity 1%, a total of 14 tons has been restored to Velvet Freeze's 185 ton system. Other benefits: In 6 months, the Purger saved 1500 lbs. of ammonia—$255. Power costs were reduced $274 per month. In less than a month the Purger paid for itself several times over.

Check your system for excess head pressures. If it's high, the Armstrong Purger offers you a real opportunity to increase your capacity. In any case, the benefits of Armstrong automatic purging are worthy of your earliest investigation. For full details . . .

SEND FOR BULLETIN 192
explains all Armstrong Purgers, their benefits and why you get them.

ARMSTRONG MACHINE WORKS
866 Maple Street • Three Rivers, Michigan

Thomas G. Prosser has been elected vice-president in charge of sales and advertising for the White Rock Corp.

The National Research Corp., Cambridge, Mass., has opened a new process-equipment plant. Cost: $600,000.

Norton Co., Worcester, Mass., now has Wallace L. Howe as its director of research and development. He succeeds Dr. Samuel S. Kistler.

Standard Cap & Seal Corp. has changed its name to Standard Packaging Corp.

Tech-Industry Services has been established to deal with industrial advertising and public relations. It is under directorship of H. Schor.

Worthington Corp. has named J. R. Hutchison as representative in Cyprus, Egypt, Greece, Iran, Iraq, Israel, Lebanon, Syria, Trans-Jordan, and Turkey.

Yale & Towne Mfg. Co. announces naming of O. S. Carliss as engineering director, and George F. Quayle as assistant director in its trucks and hoist division.

Deaths

Andrew Athens, 64, treasurer and co-owner of Royal Baking Co.—Mar. 31.

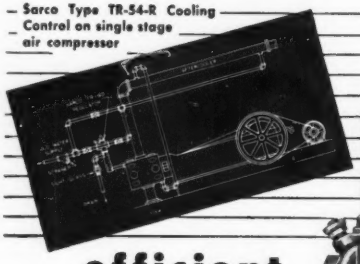
Alphonse F. Bisceglia, 67, founder and president of Bisceglia Bros. Winery Co., Fresno, Cal.—Apr. 9.

Andrew Bird Babb, 39, engineering director of National Fruit Product Co.—Apr. 26.

William R. Cole, 72, authority on food preservation and ex-professor of Univ. of Mass.—Apr. 11.

William M. McKillop, 72, former general sales manager and director of H. J. Heinz Co.—Apr. 24.

— Sarco Type TR-54-R Cooling Control on single stage air compressor



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518

Top-Quality Beverages

—*Continued from page 74*

remarks about any special condition or problem in the plant, along with the field man's recommendations.

One copy of this report is given to the local plant manager, the field man involved retains a copy, and the original is sent to the office in Dallas. It is then evaluated, and the director of field production writes directly to the bottler should anything appear to need elaboration or follow-up.

Once again, the advisory approach to any bottler's problem must be stressed. If a faulty condition at a plant is reported, a letter will suggest a means to combat it, if possible. Then, if the situation still exists during the next visit by the field man, either he will be asked to devote the necessary time to help correct the situation, or someone will be dispatched from Dallas to assist with the problem.

Since the primary object of a quality control program is to have a uniform product from all bottlers, the company will give continued help and encouragement to a plant temporarily deviating from standards. But continued off-product will result in visits by company officials and, eventually, a lost franchise.

A splendid tribute to the excellence of this working agreement with the bottlers—and to the bottlers themselves—is the fact that it has only been found necessary to drop franchises of a very small number of operators in the past ten years.

Home Office Evaluations

In addition to plant-site checks of beverage quality, a nationwide sampling system routes bottles—about twice a month per plant—to the Dallas control lab. These are collected at consumer points by the field men and Dr. Pepper district supervisors. Also, bottlers are required to send in periodic samples taken directly from their bottling lines.

Samples are mailed in one- and two-bottle cartons. First, the label and carton address are tabulated. Then a day's batch of bottles are systematically lined up and mass-checked for crown type, filling point, gas volume, Brix, appearance, yeast count, pH, and taste.

Later, data is transposed to the permanent production record that is kept for each bottler in a master file. On the reverse side of this card is a listing of the particular plant's water analysis—alkalinity, hardness (Ca., Mg., total), microorganisms (yeast, algae, animal life, bacteria), chlorine content, and pH. Water samples for this analysis are collected and sent in by field men during their routine calls.

Bottlers are rated for their performance each year. A large map of the United States is employed, and colored pins representing results from testing a minimum of twelve samples plus tabulations on field production provide a visual record. Silver pins indicate a 100 percent rating—tough to make, because even a "leaker" will detract. Yellow pins are for 90 to 99 percent rating; green, 80 to 89 percent performance; and black pins represent an evaluation below 79 percent.

In 1950, about 20 bottlers received silver ratings—an honor involving presentation of a plaque and considerable publicity in *Clock Dial*, the widely circulated company magazine.

Converging on Contamination

A red pin on the control chart indicates that yeast was spotted in a beverage sample. Such pins can usually be counted on the fingers of one hand, and much effort is expended to keep them off the board. This problem is more prevalent, of course, during summer months.

Beverage contamination is largely a yeast proposition. This is due to the low pH of the syrup, which prevents undue bacterial growth. Yeast, on the other hand, thrives in the sugar and citric acid present and causes a particularly undesirable fermentation.

A bottle is considered contaminated when it displays one colony of yeast per cubic centimeter. When such yeast is spotted in a laboratory plate-culture, the bottler is notified by phone. The field man is then located and asked to help against the problem immediately. To speed things up, the field men are equipped with microscopes so that spot smear tests can be made and the point of contamination quickly isolated.

To lick an in-plant contamination, the field man usually recommends that all equipment be torn down and sterilized. Further, he rolls up his sleeves and joins in the work, also assisting in reassembly of the bottling line. Then he stays on hand to get samples of the first new production for resubmission to Dallas.

Hard Work But Sure-Fire

While an experienced field man can usually—through knowledge of the plant and its layout—pick out the exact trouble spot in a contaminated line, he generally sticks to recommending wholesale sanitizing of the complete bottling process. While hard work, this all-out attack can be depended upon to bring a sure-fire cure.

Besides having equipment for routine tests and bacteriological analyses of samples, the home-office laboratory also has a number of special tools to cope with less-common problems of bottlers.

For example, a Polarograph provides a rapid check to trace metals such as iron and copper, which can cause—in extra concentrations—an off-taste. This new recording unit, made by E. H. Sargent, Chicago, avoids the lengthy ashing procedure required by the Spectrophotometer and reduces analysis time from a former 2-hr. down to 15 min. It provides similar accuracy—within 0.1 ppm.

If the Polarograph curve shows iron drifting above 1.5 ppm. or copper concentrating over .7 ppm., this is a sign to call the bottler. Usually, the pick-up of undesirable metal takes place in a non-stainless syrup line in which the product is idle for a length of time—say, during the lunch hour.

Another lab tool is the Fisher Nefluoro-Photometer, which is used to measure turbidity or colloidal matter in sample water submitted. On the same bench, a Beckman Spectrophotometer provides a quick check of aluminum in water and also evaluates color and turbidity in syrup samples.

End (*Resume reading on page 75*)

Production-Planned Plant

—*Continued from page 78*

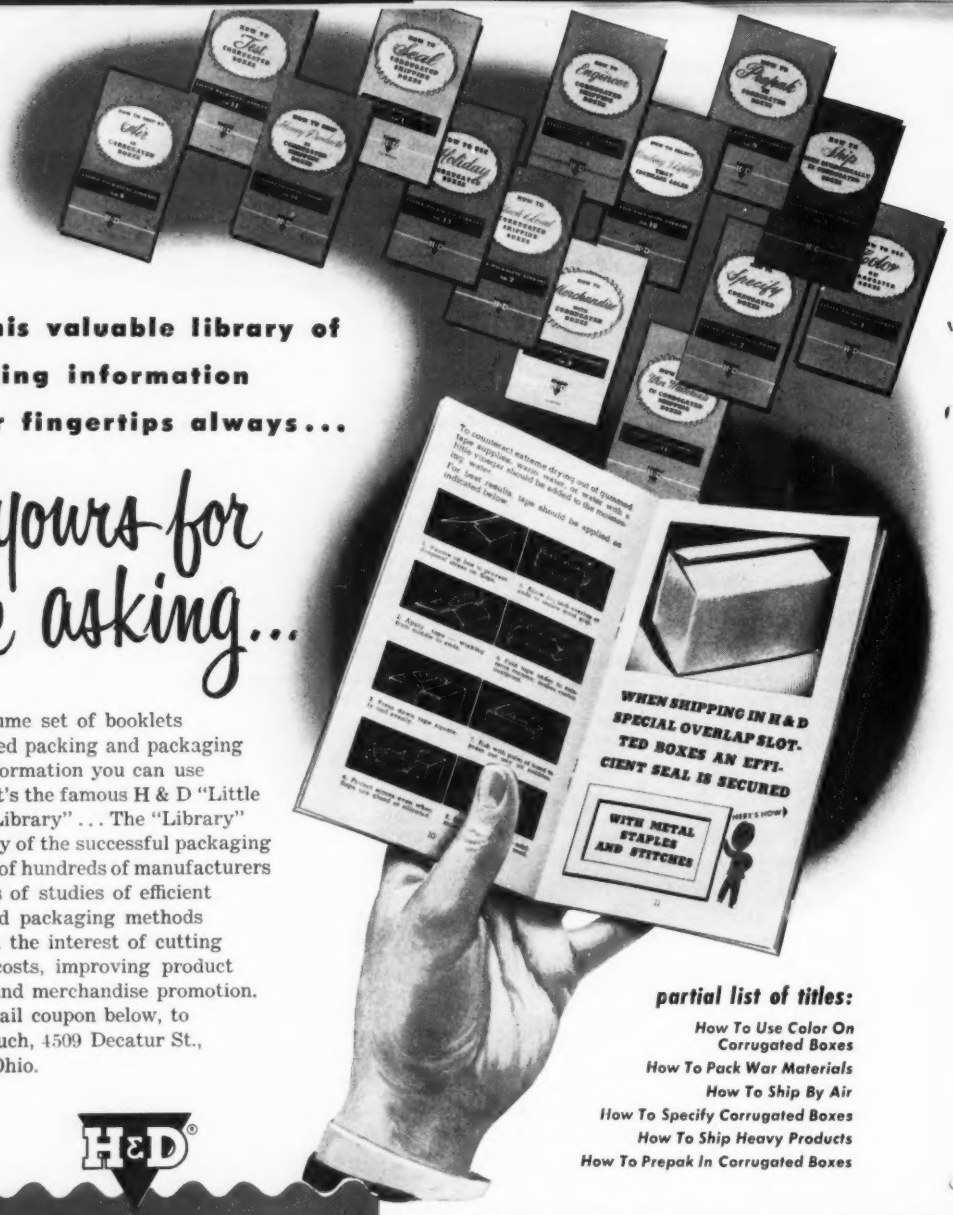
While the very latest equipment innovations are in evidence, it is interesting to note several company machine ideas and "twists" which add special efficiency to the process lines involved.

For instance, company engineers designed rotating paddle bars which not only move carcasses through the dehairing tank at uniform speed, but also thoroughly emersed them.

And further along the line, a unique continuous carcass polisher—also designed by the company—abolishes manual scrubbing. This unit passes the twisting carcass through a gauntlet of horizontal beater-paddles equipped with metal fingers—a novel operation giving a better carcass appearance. And again space is saved.

Another company innovation — proved out in Chicago headquarters—will soon be augmenting Kansas City efficiency. It's a combination small mobile hydraulic lifter and pneumatic lowering rail which allows beef hindquarters to be mechanically unhooked and power-lowered from the rail. The same mobile unit is also used to move beef forequarters.

End (*Resume reading on page 79*)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WITH METAL STAPLES AND STITCHES
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Food Plant Equipment

Blower-Type Heaters

Selection and application of blower-type, unit heaters are explained in Bulletin DS-327-A. Models described deliver heat either directly or through ducts from floor, wall, or ceiling. Different outlet arrangements, optional dampers, mixing boxes, wall intake boxes, and filters are illustrated. 56 pages.—*The Trane Co., La Crosse, Wis.*

Circle L221A on Reader Service Card

Water Conditioners

Various methods of conditioning water are covered in Bulletin 611, describing zeolite water softeners, ultra deionizers, degasitors, water treating chemicals, ion exchange resins, and other water treatments for all purposes. 20 pages.—*Elgin Softener Corp., Elgin, Ill.*

Circle L221B on Reader Service Card

Explosion-Proof Motors

Construction details of explosion-proof, fan-cooled, and non-ventilated motors are given in Bulletin 51B7286A. Fan-cooled types are available in ratings of 3 to 100 hp.; non-ventilated in ratings from ½ to 2 hp. Motors are reported suitable for operations in areas of dust, dirt, fly ash, rain, snow, or corrosive gases. —*Allis-Chalmers Mfg. Co., 1113 S. 70th St., Milwaukee.*

Circle L221C on Reader Service Card

Dust Filter

Cloth-type filter for collecting industrial dusts in various operations is Bulletin 101 feature. Employed are principles of uniform suction flow and removal of dust from filter bags by reversing air flow. 4 pages—*The W. W. Sly Mfg. Co., Cleveland 2.*

Circle L221D on Reader Service Card

Fuel Oil Heaters

Advantages of oil tank suction heaters are outlined in Catalog 714. Units are used in heating heavy grades of fuel oil to pumping temperatures. Shown, too, are preheaters that raise oil from pumping temperature to that required at burners for good atomization, combustion, and control. 6 pages.—*Hauck Mfg. Co., 124-136 10th St., Brooklyn 15.*

Circle L221E on Reader Service Card

Continuous Freezers

Preventive maintenance is theme of Manual 6 discussing continuous freezers. Ice cream producers are offered pointers on relocating freezers in plants and impressing new employees with correct maintenance procedures. Informative data is accented. 12 pages.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle L221F on Reader Service Card

All-Electric Drives

Relation of packaged, all-electric, adjustable-speed drives to production machines and processing equipment is delineated in illustrated Bulletin D-2311. Briefly discussed are seven basic functions in drives of five types ranging in ratings from ¾ to 200 hp. Supplementary information includes diagrammatic and tabular charts. 8 pages.—*Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10.*

Circle L221G on Reader Service Card

Can-Handling Systems

Engineering data, plant layouts, and necessary equipment for can handling are spotlighted in Catalog 100. Numerous designs of equipment are given, such as can washers, boosters, elevators, lowerators, conveyors, and other items. Price data is included. 28 pages. —*The Barker Co., 5812 22nd St., Tampa 4, Fla.*

Circle L221H on Reader Service Card

Crushers

Complete line of crushers are described in Bulletin 12-C, including ring-type, single and double rotor, single roll, and double roll units. Design is for reducing sugar, coal, coke, glass, cullet, gypsum, lime, metal turnings, sulfur, and other lump materials. Photos, drawings, also capacity and power requirements are given. 16 pages.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Circle L221I on Reader Service Card

Drying Units

Industrial dryers of all types are presented in Bulletin 191. Food field is emphasized in relation to cereals and fruits. Specific installation of coconut dryer is given. Profusely illustrated. 4 pages.—*C. G. Sargent's Sons Corp., Graniteville, Mass.*

Circle L221J on Reader Service Card

Anent Dust Collectors

Illustrated with photos and drawings, Bulletin 914 tells how cloth-bag dust collectors work

making a quality product is *your* business packaging it economically is *our* business!

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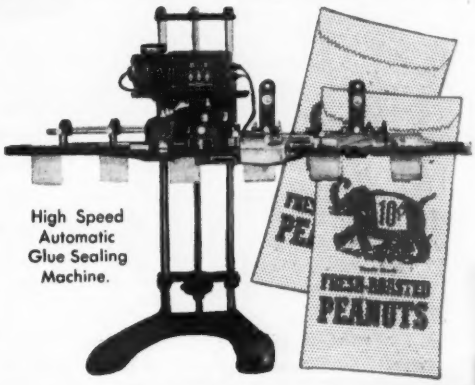

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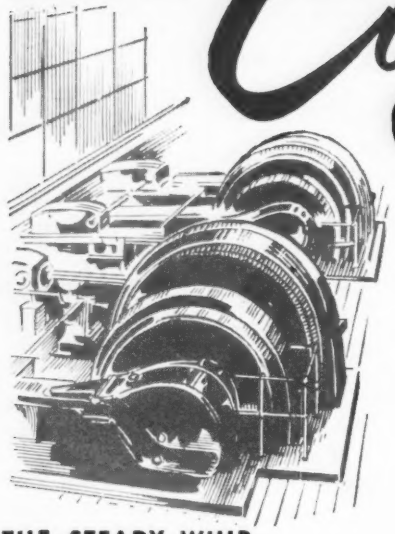

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Like the uninterrupted output of the power plant, the flow of a chemical process should never be stop-and-go. To be profitable, each step—including separation and clarification — should build on each previous step. De Laval centrifuges take the lost motion out of (1) liquid-liquid (2) liquid-solid and (3) liquid-solid-and-liquid separations by making each one continuous.

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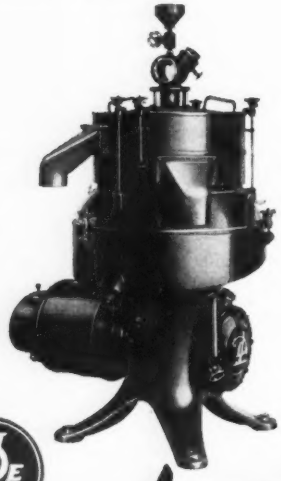

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and gives data on installing and maintaining them. Uses vary from collection of carbon black, cork, fine wood, graphite, pigments, and lime, to soap, metal oxides, and similar dusts. 8 pages.—*Pangborn Corp., Hagerstown, Md.*

Circle L221K on Reader Service Card

Versatile Pump

Though basically a pump, unit described in Bulletin 300 will do the work of a chemical feeder, meter, an instrument, a filling machine, proportioner, and a sampler. Both manual and automatically-controlled types are discussed. 24 pages.—*Lapp Insulator Co., Inc., Process Equipment Div., LeRoy, N. Y.*

Circle L223A on Reader Service Card

Cooling Coils

Latest developments in extended-surface cooling coils, for use with direct expansion refrigerants and chilled water in air conditioning or process application, are summarized in revised Bulletin DS-365. More than 50 pages are devoted to performance tables and specifications. 72 pages.—*The Trane Co., LaCrosse, Wis.*

Circle L223B on Reader Service Card

Control Equipment

Pressure Controller

New non-indicating pressure controller is outlined in Bulletin 16-1. Covered are principle of operation, specifications, design features, mounting dimensions, and other data. 8 pages.—*Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Circle L223C on Reader Service Card

Analytical Balancers

Pamphlet presents line of analytical projection balancers, with data on capacities, sensitivity, ranges, and dimensions. Advantages are detailed. 8-page foldout.—*Sartorius Div., C. A. Brinkman & Co., Box 532, Great Neck, N. Y.*

Circle L223D on Reader Service Card

Electrical Apparatus

Complete listing of company's electrical control apparatus is given in handsome bulletin. Topics include control in relation to refrigeration, starters, resistors, rheostats, gas measuring, heating lights, and regulators. 44 pages.—*Cutler-Hammer Inc., Milwaukee 3.*

Circle L223E on Reader Service Card

Dimensional Microscopes

Illustrated with photos and sketches, Catalog D-15 presents models and accessories of three-dimensional type microscopes. Features include dust-proof seal in prism housing, interchangeable objectives, extra wide focusing rack, and sliding nosepieces. 20 pages.—*Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.*

Circle L223F on Reader Service Card

Liquids & Meters

Chemicals, syrups, hot and cold water, oils, and other liquids, are the province of meters detailed in Catalog 566-7. They are available in sizes ⅜ to 6 in. for flow rates up to 1,000 gpm. Pressures range from 150 to 500 psi. 20 pages.—*Neptune Meter Co., 50 W. 50th St., New York 20.*

Circle L223G on Reader Service Card

Materials Handling

Power Conveyors

Pictorial Bulletin 302 shows power conveyors in different arrangements for variety of tasks. Described are portable, inclined, floor-to-floor, bag and keg types, and other conveyors with specific functions. 32 pages.—*Harry J. Ferguson Co., West Ave., Jenkintown, Pa.*

Circle L223H on Reader Service Card

Electric Trucks

Various models of electric trucks are described in Bulletin 703. Pallet-stacking types come in capacities of 2,000 and 3,000 lb. Other units are listed with full specifications. 4 pages.—*Raymond Corp., 8762 Madison St. Greene, N. Y.*

Circle L223I on Reader Service Card

Elevating Tables

Complete line of hydraulic elevating tables are described in Bulletin 206. Some models can be used for die handling or work positioning; others are for strip and sheet-feeding operations. Capacities: From 2,000 to 20,000 lb. 4 pages.—*The Raymond Corp., 6288 Madison St., Greene, N. Y.*

Circle L223J on Reader Service Card

Hand Trucks

Two- and four-wheel hand trucks are depicted in recent brochure, Form 508-B. Types described include trailers and dollies. Construction features are detailed and specifications are charted. 12 pages.—*The Howe Scale Co., Rutland, Vt.*

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Conveyor-Plus-Elevator

New Booklet 2475, with information on conveyor-plus-elevator

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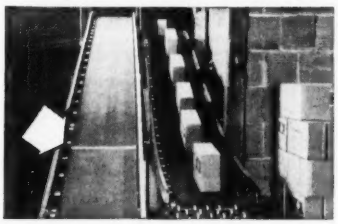

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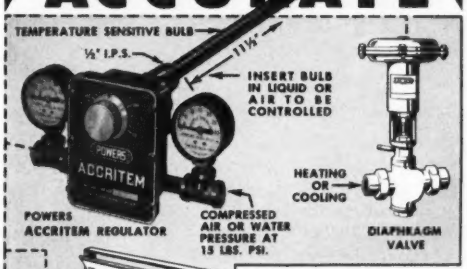

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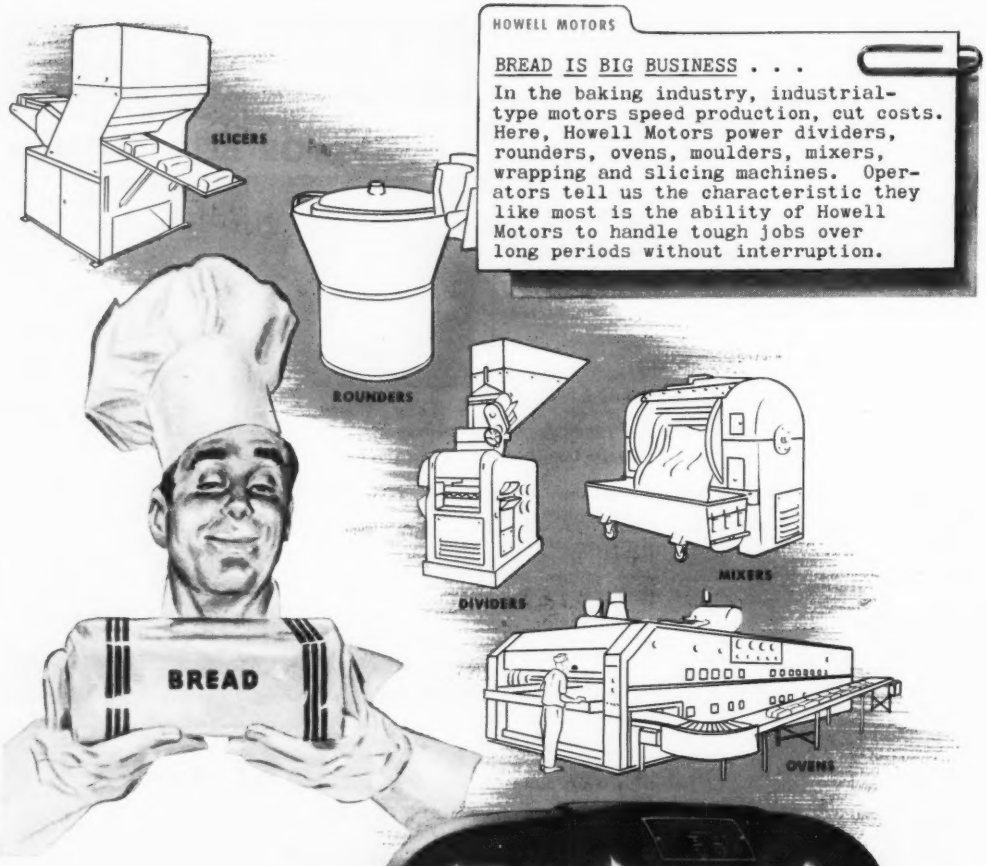

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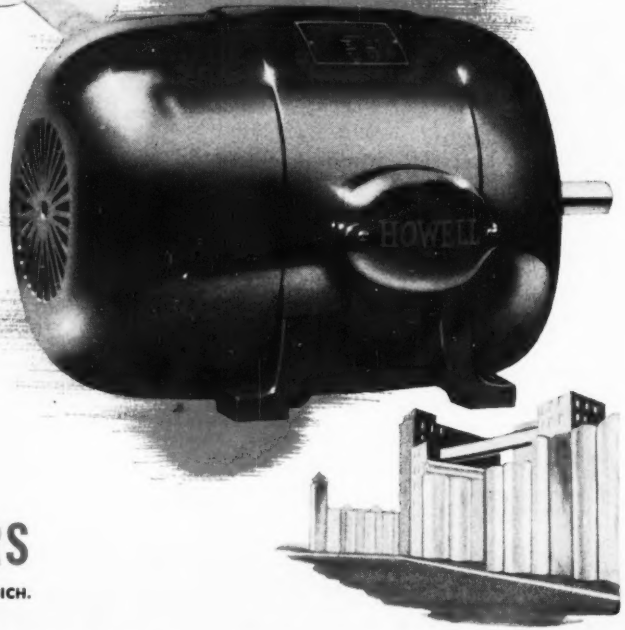

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unit, contains photos, layout drawings, engineering data, charts and formulas. In application, over 150 materials are analyzed for average weight and characteristics such as size, flowability, and abrasiveness. 28 pages.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

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Diesel Trucks

Case history showing utilization of diesel trucks is furnished in foldout titled *Paul Bunyan "Had a Big Blue Ox."* Stamina and rugged features of units are outlined, along with supporting data. 6 pages.—*General Motors Corp., Truck & Coach Div., 660 S. Blvd., East, Pontiac 11, Mich.*

Circle L225A on Reader Service Card

Electric Fork Trucks

Complete survey of electric fork-truck line is available in recent catalog. Seven models are described, giving operating characteristics, engineering developments and maintenance features. Accessories and attachments are included. 20 pages. — *Lewis-Shepard Products Inc., Watertown, Mass.*

Circle L225B on Reader Service Card

Plant Supplies

Pallet Rollers

Brochure combines technical data with advantages in describing pallet rollers. Sizes and capacity data accompany illustrations. 4 pages.—*Frank L. Robinson Co., Latham Sq. Bldg., Oakland, Calif.*

Circle L225C on Reader Service Card

Concrete Paint

New paint for use on interior or exterior concrete, cement block, brick, and stone, is announced in leaflet. Resistant to water, acid, or alkalis, 1 gal. is stated to cover 400 sq. ft. according to maker—*Michel-Cather, Inc., 2 Park Ave., New York 16.*

Circle L225D on Reader Service Card

Facts on Colloids

Some 24 types of colloids are described in non-technical Bulletin 21. Derived from seaplants, product is used as stabilizer for improvement of uniformity in soups, syrups, dressings, milk products (for custardizing effect) and many other foods. 4 pages.—*Seaplant Chemical Corp., 63 David St., New Bedford, Mass.*

Circle L225E on Reader Service Card

Glass-Container Lids

Flexible, reusable lid for glass containers is presented in Bulletin 152. Maker states no tools are needed for lid removal. Also, lids are reported to have possible secondary uses, such as for refrigerator dishes, cocktail coasters, etc. 4 pages.—*Buckeye Molding Co., 206 S. Second St., Miamisburg, Ohio.*

Circle L225F on Reader Service Card

Acid-Proof Flooring

Problems of corrosion resistance in flooring are covered in Bulletin AB17. Describing use of acid-proof brick floors, it continues with drawings and photos on installation procedures. 16 pages.—*The U. S. Stoneware Co., Akron 9.*

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Detergents

Silicated detergents, as applied in a score of cleaning operations, are aptly illustrated in recent Folder 36-2. Chart of specific uses is included, giving correct concentration and water temp.—*Philadelphia Quartz Co., Public Ledger Bldg., Philadelphia 6.*

Circle L225H on Reader Service Card

Miscellaneous

Conserving Aluminum

Published to promote non-ferrous scrap campaign, booklet *Conservation of Aluminum* contains collection of information on efficient use of the metal as well as proper handling of scrap. 8 pages.—*The Aluminum Assn., 420 Lexington Ave., New York 17.*

Circle L225I on Reader Service Card

Machinery Parts

Variety of cast and wrought alloy parts used to solve abrasion, corrosion, and high-temperature problems are described in new catalog *Long-Wearing Machinery Parts.* More than 60 blueprints, tables, and photos show sizes and shapes in which parts are used. All are fully comprehensive. 24 pages.—*Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17.*

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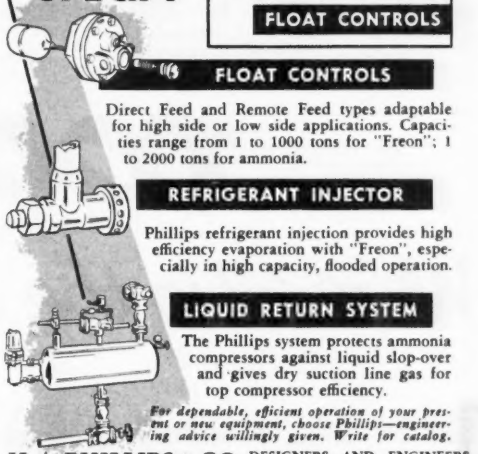

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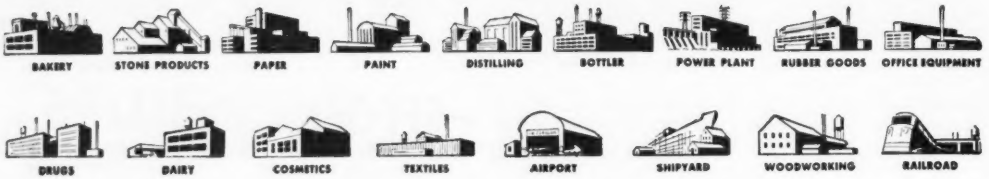

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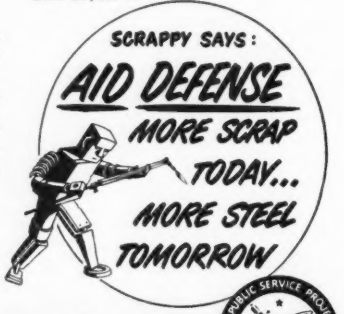

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Chem. Ph.D. deg.; animal nutrition b'kgr'd. 8,500
"Many Junior Positions"
Call, write or wire:—Gladys Hunting (Consultant)
DRAKE PERSONNEL
7 W. Madison St. Chicago 2, Ill.

POSITIONS WANTED

CHEMIST, RESEARCH & Production, with wide experience in many phases of manufacture and development of confectionery, chocolate, macaroni products, many desserts, and other food products, desires position of responsibility to fully use his ability. PW-4392, Food Engineering.

EXPERIENCED All phases pickle and preserve industry. Qualified in management, production layout, maintenance, cost, office management, union negotiation, purchasing, technical background. Know frozen foods, and canned foods production. Willing to assume responsibilities. Married, will relocate. Some sales experience. PW-4304, Food Engineering.

FOOD CHEMIST: 9 years very varied experience in food research and development: bench, kitchen, pilot plant, administrative. Excellent academic and industrial biochemical background. Now employed in supervisory capacity. Age 35, M.S. Single. Desires new position in development or technical service and liason. PW-4448, Food Engineering.

FOOD TECHNOLOGIST—Age 32—B.S.—Experienced in setting up and supervising quality control dept.—Frozen and canned products—now employed—wishes to make a change—Northeast preferred. PW-4406, Food Engineering.

(Continued on page 228)

INGREDIENTS
For the Food Processor

CARROT OIL makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
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QUAKER CITY COLD STORAGE CO., Inc.
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3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
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c. Nutrition
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e. Freezing
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RESTAURANT MANAGEMENT
GENERAL STUDY OF COOKING
PREPARATION OF SALADS
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CAKE DECORATING
STUDY OF MEATS

MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

ATTENTION EMPLOYERS

If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Foreladies, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS

Box 383 CORAL GABLES 34, FLORIDA
Telephone: 83-1301

POSITIONS WANTED

(Continued from preceding page)

FOOD TECHNOLOGIST, 10 years research and development with supervisory experience. 2 years technical selling and training salesmen. Desires opportunity in research or technical selling. PW-4198, Food Engineering.

MECHANICAL ENGINEER experienced in fruit and vegetable processing and plant management interested in re-locating. Age 42. Details as to virtues, faults, record, etc., upon request. PW-4325, Food Engineering.

PRODUCTION MANAGER for food plant. Thorough experience in management and administration, plant installation, sugar products development work. PW-4400, Food Engineering.

WORKING FOREMAN. Capable expert commercial chef. Over 25 years practical and technical experience in production of quality foods, Tomato and vegetable products. Soups, Meat, Condiments, Preserves, Jellies. Allied lines, Specialties, and products for the Italian trade. Will relocate. Available immediately. PW-4217, Food Engineering.

WOULD YOU Be interested in an expert who is capable of reducing costs and expediting any or all of the following operations? Packing & Shipping—Layout of stock for assembly line operations—materials handling, including conveyorized and fork-lift methods — Loading and unloading of freight cars and trucks—material control, using key punch-cards or manual methods—I have averaged 28% reduction in personnel in the concerns I have reorganized. I have been retained a second or third time as two of the larger plants have expanded. PW-4162, Food Engineering.

SELLING OPPORTUNITIES WANTED

SALES ENGINEERING Organization with established following in Chemical, Pharmaceutical and Food industries, desires to represent additional processing equipment manufacturers in New York, New Jersey, Delaware and Pennsylvania. Commission only. RA-4455, Food Engineering.

SALESMAN COVERING Missouri and Kansas seeks product of merit to represent that area. P.O. Box 825, Minneapolis 1, Minn.

TECHNICAL SALESMAN, wide experience in all phases of production research and training salesmen. Administrative and management experience. SA-4199, Food Engineering.

FOR SALE

Large Packer Wishes
to Dispose of a substantial inventory of formerly well-known California Fruit and Vegetable labels and their accompanying trade marks. Reply FS-4357, Food Engineering.

WANTED TO PURCHASE—SPRAY DRYER
Stainless Steel—Dehydrating capacity between 500 & 1000 lbs. moisture per hr. As complete a unit as possible. Please furnish fullest details of performance and auxiliary equip't. If drawings are avail. they will be returned promptly after study. Consideration would be given leasing plant if suited to food processing and within easy trucking distance of N. Y.

BO-4333, Food Engineering
330 W. 42 St., New York 36, N. Y.

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Established Canadian manufacturer-distributor seeks new lines to make and/or sell. Could make from your formula on a royalty or purchase basis.

BO-4237, Food Engineering
330 W. 42 St., New York 36, N. Y.

WANTED
TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pins, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351,
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FOOD PLANT WANTED
We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one of more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies
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50—50 gallon stainless steel
SYRUP DRUMS
Preferably with rubber bumpers
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FOR SALE
Complete Cheese Processing Equipment

Capacity 6,000 to 8,000 pounds per hour, consisting of swivel cleaning tables, emulsifying table, conveyors, stainless steel 2-worm grinder, stainless steel horizontal cooker, 2 and 5 pound convertible stainless steel filler and stainless steel pouch former.

Equipment practically new.
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FOR SALE
56—36" x 54" Skid Platforms
300 gal. Copper Still with copper condensor and copper tank
80 qt. 4-speed Hobart Vertical Mixer
276 Enterprise Food Grinder, belt driven
250 gal. Copper steam jacketed kettles for 100 lbs. working steam pressure
SAVAGE BROS. CO.
2633 Gladys Ave., Chicago 12, Ill.

FOR SALE
2—75 H. P. High Pressure Brownell HORIZONTAL STEEL BOILERS
Complete with all automatic controls, 75-Ft. Sectional Steel Stack, 5000-Gal. Oil Tank and all necessary electrical control panels.
FREDERICK W. HUBER INC.
268 West Broadway New York 13, N. Y.

WE HAVE IN STOCK
FOR IMMEDIATE DELIVERY
THE FOLLOWING TYPES OF EQUIPMENT

BOILERS
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DAIRY
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MATERIAL HANDLING
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MEAT PACKING
MIXERS
MOTORS
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PUMPS
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STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

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We Buy One Item or Entire Plants

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PHONE: CHesapeake 3-5300

FOR SALE
Rogers Copper Vacuum Pan

48" x 120" Union 8-14-16, Steam, Vacuum Pump, gauges, etc. **Worthington 7½ HP Compressor and McQuay Blower** for Air Conditioning.

Liquidators
Gordon Equipment Company
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JAR CAPS
Approx. 280,000 53 M.M. Anchorvac N style. Plain enamel inside, Gold outside. BRAND NEW.
Price $6.00 per M f.o.b. Allentown, Pa.
ALLEN PRODUCTS CO.
ALLENTOWN, PA.

IMMEDIATE DELIVERY
125-Gallon Stainless Steel Girdler Turbine Type Premixing Tank, Platform and 7½ H.P. Main Drive 220 Volt 60 Cycle 3 Phase Motor.
Practically new. Less than a year old. Used on a limited number of test runs only.
Write to: T. R. STEVENS
American Machine & Foundry Co.
511 Fifth Ave. New York 17, N. Y.

FOR SALE
CONVEYOR CHAIN
350 ft. New & 450 ft. Used 32" width, single side bar, 3¼" pitch, ladder-type; sprockets available. Original use, donut cooling conveyor.
F. W. STOCK & SONS, INC.
107 Product Exchange, New York 4, N. Y.
Phone Bowling Green 9-4655

FOR SALE
1 Model SHA Triangle Automatic POWER FEED NET WEIGHER
New, never used
Complete with material feed hopper, dust hood, and ½ HP AC 110/220 volt GE Cap motor $860. FOB California. New factory cost $1090. FOB Chicago.
FS-4268, Food Engineering
68 Post St., San Francisco 4, Calif.

FOR SALE
2—Mt. Gilead Juice Presser, 12" Rams with transfer car, good.
1—Leaf type filter, monel screens. New.
2—Cherry Pitters, reconditioned.
98—5 gallon cans pasteurized strawberry juice.
WESLEY ORBAKER
Williamson, N. Y. Phone 3111

FOR SALE
150 Gal. Aluminum Kettle, jacketed;
Refrigerator;
Balances;
Oven;
Assorted glassware.
BROOKS LABORATORIES
TIVOLI, N. Y.

"CONSOLIDATED" MEANS IMPROVED SERVICE

LARGER STOCKS • MODERN EQUIPMENT • IMMEDIATE DELIVERIES

DRYERS

3—6'x50' Louisville Rotary Steam Tube.
1—4'x8' Flaker or Cooling Roll.
6—Atmos. Double Drum Dryers—1—3 & C 28"x60"; 4—Buflovak 32"x90" & 32"x72"; 1—Buflovak 42"x120".

MIXERS, Dry Powder

2—Kilby jack. ribbon, 600 cu. ft. stuffing boxes.
1—Howes 3000# dbl. ribbon.
1—Day Size F 1850#; 1—Munson Rotary 1000# batch; 2—Day Size D8 800#; 2—Broughton 700# & 1500#; 2—Jabez Burns 500#, ribbon.

MIXERS, Miscellaneous

4—B.P. 3000 gal. jacketed Mixers, size 30, type X-BS. Size 24, type X-BS.
1—B.P. 1200 gal. unjack.
1—BP 625 gal. Size 21 type X-BB; 3—350 gal.; 1—100 gal. Vacuum size 15 type VII-BB; 1—100 gal. size 15 type VI-BB; all jacketed.
1—Day size 30 Imperial unjacketed 75 gal. S/S lined S/S blades.
2—Reed 40 & 50 gal. double arm Mixers.

VACUUM PANS

1—Burkhard Jacketed 40 gal. Copper Vacuum Pan, 26" dia. x 26" deep.
1—All Copper 125 gal. Vacuum Pan, 30" dia. x 30" deep.
1—300 gal. Jacketed Copper Vacuum Pan, coils, 44" dia. x 36" deep.
4—Mojonnier S/S Vacuum Pans, 3', 4', 5' and 6'.

EVAPORATORS

1—Zaremba Single Effect, 54' dia. x 16', Black Steel body, copper tubes, 556 sq. ft., with Elliot Barometric Condenser.
1—Swenson Triple Effect Evaporator, 1320 sq. ft. total. With copper tubes, steam pumps, condenser and piping.
1—Swenson Single Effect, copper tubes, 440 sq. ft., condenser, pumps, etc.

PACKAGING MACHINES

2—Pneumatic Scale Packaging Lines, incl. Carton Feeder, former liner, Weigher, Sealer, etc.
3—Transwrap Machines, Models A and B.
1—Standard Knapp #429 Self-Adjusting Gluer-Sealer & Compressor Unit.

COLLOID MILLS

1—Charlotte ND-20 Horizontal Colloid Mill, Type #316 Stainless, 20 HP.
1—U. S. Horiz. Colloid Mill, 100-600 GPH, with 2—10 HP motors.
1—Eppenbach Vertical Size B Sanitary type S/S Colloid Mill, 3—30 GPH, Explosion proof motor.
1—U. S., Jr. Model Colloid Mill, 50-60 GPH, with 2—3 HP motors.
2—Premier Colloid Mills, Paste type, V-3-2109, Stellited Rotors, 7½ HP.

SCREENS & SIFTERS

1—"Selectro" 3'x8' Double Deck, Vibrating Screen. Rebuilt.
1—"Selectro" Single Deck Vibrating Screen 3'x8'; 1—1½'x5', rebuilt.
1—Day S/S Sql. Deck, 40"x84".

LABELLING MACHINES

4—World & Ermold Semi Automatic; 2—World Rotary Automatic; 3—Burt Adjustable Wrap-Around; 6—N. J. Pony Labellrites.

FILTERS

7—Filter Presses from 7"x7" to 42"x42" Cast Iron, Plate & Frame, Recessed, Open and Closed deliveries.
1—30"x30" Aluminum Filter Press, 45 Chambers.
1—30"x30" Shriver, jack. 30 chambers.
2—Sparkler Filters, 18D4 S/S & 33D12 Steel.
8—Oliver Vacuum Filters, incl. 8'x12', 11'6"x14', 11'6"x18'.

KETTLES

28—Aluminum Jacketed Kettles, from 50-500 gal., some agitated.
13—S/S Jacketed Kettles, from 30 to 300 gals., some agitated.
18—Copper Jacketed Kettles, from 25-600 gals.
8—Dopp C.I. jacketed 100, 150, 350 & 600 gal.; 3—150 gal. double motion agitated & jacketed.

TANKS

2—12000 gal. steel, 8'x32'.
5—9800 gal. Horiz. S/S Storage Tanks, jack.
2—100 gal. S/S lined Vertical Tanks.
45—Aluminum Rectangular Storage Tanks, 800 gal., 650 gal. & 200 gal. capacities.
40—Misc. Steel Tanks, 500 gal.-15,000 gals.

MISCELLANEOUS

1—Buflovak 6' Vacuum Crystallizer.
1—5'x16' Mech. Jack. Cooker or Dryer.
2—42" Amer. Tool & Machine Co. S/S Centrifugals, 40 HP motor.
1—Telhurst 40" Monel Centrifugal.
86—Portable Agitators, all sizes & speeds.
3—Mikro Pulverizers, 2SI, 2TH, 4TH.
1—Capem SIF Capping Machine.
3—42"x72" Vertical Retorts, 3-basket.

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The Oldest and Largest Dealer in Used and Rebuilt Processing Machinery

OUR 35th YEAR

CONSOLIDATED PRODUCTS CO. INC.

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Charles S. JACOBOWITZ *Co.*

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We have in stock for immediate delivery all makes and sizes of labelers, with capacities from 20-240 BPM! Tell us your requirements.

FLASH! Just purchased Pony Labelrite, model 86-M, used less than one year. Immediate delivery, subject to prior sale.

What are your requirements for Labelers, Fillers, Screwcappers? What surplus equipment do you have to dispose of?

Serving American Industry for over 30 Years

IMMEDIATE SHIPMENT

Bird Centrifuge, type CH, SS cyl.
Tunnel Truck Dryer, 22 trucks, 600 pans.
Drum Dryer, 5' x 6'.
Double Drum Dryer, 4' x 9'.
Rotary Vacuum Dryer 30" x 8'.
Rotary Dryers, 25" x 15', 4' x 16', 6' x 14'.
No. 7 Sweetland Filter 2" Centers, 28 leaves.
Shriver 36" Filter, 35 chambers.
Oliver 8' x 10' Rotary Filters (3).
Stainless Steel Kettles, 40 gal.
Pfaudler, 400 gal. glass-lined Reactor.
Kombinator, Stainless Steel K200.
Mixers—Paddle, Champion, Ajax, Readco-Dough.
Tanks—300 to 30,000 gal.
Vacuum Pumps—Nash H7 and Stokes 212C.

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WE CAN FILL YOUR NEED FOR GOOD MODERN PRODUCTIVE EQUIPMENT

New SS Reactors From 50 Gals Up
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From the FMC STOCK!

Stock No.	Description
3259G5	Horizontal Steel Retorts 66" x 14'7"; double door
3490	Climax Rectangular Sterilizer Jacketed; 49" x 42" x 96"
C6-124	Sharples No. 16 S.S. Centrifuge
C6-126	DeLaval Yeast Separator Type OVK
3513	Premier S.S. 3" Colloid Mill; 5 HP
3397	Eppenbach QV8 Colloid Mill; 5 HP
H2-179	Premier S/S 8" Colloid Mill; 20 HP
H2-178	Manton Gaulon SS Homogenizer; 40 HP
3497	Swenson Walker Jacketed Crystallizers, 2' x 10' to 40'
1383	Buffalo Vac. Shelf Dryers; 20 shelves; 60" x 160"; double door; complete
3407	Buffalo Vac. Shelf Dryers; 20 shelves; 40" x 42" complete with accessories
1200U1	Proctor & Schwartz Apron Dryer; 12 section, 76' long; S.S. Belt 13' wide; complete
D11	Louisville and Davenport Steam Tube Dryers from 16' to 35' long
3026	Buffalo Rotary Vacuum chrome plated Drum Dryer; 5' x 12'
3316	Bagley & Sewell Double Drum Dryer; 28" x 60"
3414	Rotary Drum Dryer with steam heated nickeled Drum 48" x 46"
1000 C	Multiple Effect Evaporators Steel or Copper up to Sextuple Effect
3168	Sweetland Pressure Filters from No. 2 to 12
3484	Rietz Rd 18 Stainless Disintegrator; 30 HP
3502	Stainless Heat Exchanger; 20" x 18'; 280 sq. ft.
1000C5-6	C. H. Wheeler Surface Condensers; 2100; 4000 sq. ft.
3340	NEW Stainless Kettles good for 100 lb. steam; sizes up to 500 gal. now in stock
XXX	Labelers always in stock for spot and wrap around labelling; semi or fully automatic
3499	New and Rebuilt Powder Mixers in all sizes
3166	Jacketed Mass and Do Mixers from 1 BBL to 6BBL.
McAllen-1	Schleyer Stainless Centrifugal Pump; 1½"; 5 HP
3484	Nash Hytor Vac. Pump Model H4; 2" x 2" with 10 HP
P30	Moyno Stainless Pump F6; 2½" x 2½" with 5 HP
P18-700	LeBour Stainless No. 10 Pump 60 GPM; 5 HP
3273	Pfaudler Glass-lined Reactor; Jktd. Agitated; 47" x 67";
3424K2	Monel Jacketed and Agitated Reactor; 250 gal.
3424 K9	Stainless Jacketed & Agitated Reactor; 475 gal.
3442	Gyratory Screens and Sifters by Orville Simpson, J. H. Day, Selectro etc. from 20" x 48" to 40" x 120"
3470	Stainless Bubble Cap Column 16 section; 8-3½" x 19'
9908H3	Aluminum Steam Jktd. Vacuum Pan; 40" x 60"
3041C1	Stokes & Smith Auger Powder Fillers with Vac. attachment
2246	Stokes & Smith fully automatic Powder Fillers
3484A48	M. & S. 10 Pocket Stainless Rotary Fillers
3280	Horix Stainless HEV 14 Stem Grav.-Vac. Fillers
2184	Filler Mach. Co. and Elgin Fillers up to 11 Pistons
3484 A40	Langsenkamp Stainless Model B-EZ Adjust Pulpers
2500 C1	Chisholm Ryder Stainless Model B Juice Extractors
3451	Urschel Model B Dicers with 2 H.P. motors

Many More Items too numerous to list. Send us your Inquiry.

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157 Hudson Street,
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FOR SALE FROM STOCK

6—3000 gal. Horiz. Stainless Steel Tanks, insulated & agitated, sanitary fittings, excellent for transporting, storing or holding milk, food products, wines, etc.

4—Stainless Steel Steam Jacketed Kettles, with double motion agitators. 250 gal., and 150 gal.

70—Stainless Steel and Stainless Clad Steam Jacketed Kettles, 10, 40, 60, 80, 100, 150, 500 gal.

35—Stainless Steel Tanks, 30, 60, 100, 150, 200, 300, 400, 500, 1000, 1400, 2350, 3000, 4200 and 5700 gal.

1—10 gal. Inconel Reaction Kettle, jktd., agit.; with Dowtherm system.

3—Aluminum Tanks, closed, 500, 1350 gal.

7—Powder Mixers, 50#, 100#, 200#, 400#, 600#, 2300#, 2400#.

3—Selectro Stainless Steel Vibrating Screens, two-deck, 2'x7', enclosed.

10—Rotary Pellet Presses, Stokes B-2, D-3 & D-4; Kux model 25.

2—Triangles G-2-C Elec-Tri-Pak Weighers & Fillers.

2—Elgin Auto Twin Piston Fillers.

1—International 12 spout automatic Vacuum Filler, Stainless.

2—Mojonnier #90 Rotary Vacuum Fillers, 14-spout; stainless.

1—Pneumatic Scale Auto. Duplex Labeler, Front & Back.

1—Kyler model "H" Wrap Around Labeling Machine, to #10 cans.

1—Feinc Rotary Vacuum Filter, string discharge, 4'6" dia. x 6', aluminum.

2—Sweetland Filters, #2, & #12.

1—Klein #2 Stainless Steel Leaf Filter, 97 sq. ft.

1—Niagara #275 Filter, Monel leaves, heresite lined tank.

10—Distillation Columns, aluminum, copper, steel.

1—Fitzpatrick "D" Comminuting Machine, Stainless Steel.

ONE-PIECE WELDED STEEL TANKS
22—15,190 gal. Horiz. Lastiglas lined.
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10— 7,000 gal. Vertical, closed, mammut lined.
8— 7,700 gal. Vertical, closed, mammut lined.
Excellent Condition

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FOR SALE
3 ft. & 4 ft. Stainless Steel Vacuum Pans.
30 H.P. Kewanee Scotch Mar. Boiler, oil fired.
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3—32" x 90" Buffovak Double Drum Dryers.
3000 gal. S.S. Truck Tanks, Trailerized.
100 gal. S.S. Clad Jkt. Kettles, 30" x 52".
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100 to 250 gal. S.S. Mix Tanks, water jkt.
300 to 4000 gal. Glass Lined Tanks.
26" Centrifugal Extractors, 3 H.P.
Gruendler Junior Pulverizer, 10 H.P.
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Model 148C Stokes High Vacuum Pump, 1½ H.P.
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2" Cherry-Burrell S.S. Pump, 5 H.P.
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Milk Pasteurizers, Coolers, Fillers, Washers.
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Murray Hill 2-4616

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SEE THESE VALUES!

1—Pfaudler 350 gal. glass-lined, jacketed, agitated Reactor.
4—Pfaudler 100 gal. glass-lined, jacketed Stills with glass-lined condenser & receiver.
1—Hersey 3' x 26' s.s. Rotary Dryer.
8—2500 gal. Alum. Storage Tanks. C20.
2—Sharples s.s. Super-D-Hydrators, C20 & C27.
1—#6 Mikro Atomizer, s.s., 20HP.
2—Oliver 8' x 10' Monel Rotary Filters.
3—Buflovak 32" x 100" double drum Dryers.
1—Albright-Nell 60" x 80" single drum Flaker.
4—Groen 150, 125 gal. s.s. agitated Kettles.
2—Baker Perkins, Day 100 gal. steam jacketed Mixers, sigma blades.
1—Baker Perkins Type 171/2 RVM double arm, jacketed Mixer, 325 gals.
2—#12 Sweetland Filters, 72 s.s. leaves, 2" centers.
1—Fitzpatrick Comminutor Model D, s.s.
1—Link Belt Roto Louvre Dryer 2'7" x 8' Monel.
5—s.s. Revolving Pans 38" dia.
1—Tolhurst 32" Monel suspended Centrifugal.
1—Fletcher 40" s.s. suspended Centrifugal.
1—#7 Sweetland Filter, 27 leaves.
2—Rotex Sifters 40" x 84", 40" x 104".
4—Shriver 30", 24" P & F Filters.

Send for complete stock list.

BRILL EQUIPMENT COMPANY
Member American Rebuilders Assn.
2401 Third Ave., N. Y. 51, N. Y.
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BUY FROM RELIABLE DEALERS

1—Sweetland #12 Filter—36 Leaves
1—Devine 13 Shelf 40" x 43" Vac. Dryer
1—Buflovak 6' Vac. Jack. Crystallizer
5—Shriver 18" to 42" Wd. Plate & Frame Filter Presses
2—Sperry 36" C. I. Filter Presses, Hyd. Closures
1—New 48" S.S. Tolhurst Centrifuge.
3—Mikro 2 TH and 2 FF Pulverizers
1—Raymond 16" Screen Mill.
1—Stokes "DD-2" Rotary Tablet Machine
8—Stainless Steel Jacketed Kettles 100 to 950 gals.
8—Stainless Steel Tanks 300 to 5700 gals.
3—Horiz. Steel Tanks 3000 to 12,000 gals.
6—Stokes 212C Vac. Pumps W.C. 100 C.F.M.

Complete line of Mixers, Packaging and Factory Handling Equipment, Screens etc. Just write us for what you want. We also pay top prices for Surplus.

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533 West Broadway
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MODERN REBUILT EQUIPMENT

At Tremendous Savings

UNION Rebuilt Machinery

Established 1912

International Stainless Steel Straightline Vacuum Filler, with Automatic Feeder.
Resina LC Automatic Capper.
Capem E4F Rotary Capper.
Chisholm Ryder New Way Model MH Wraparound Labeler.
Stokes and Smith Transwrap Model A Volumetric and B Bag Filler for viscous and semi viscous materials.
Baker Perkins BB, JNM and Readco Heavy Duty 50 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.
Robinson 800 lb. S. S. Dry Powder Mixer and Sifter with Screw Elevator.
Day and Robinson 100, 800, 1500, 2000 lbs. Dry Powder Mixers and Sifters.
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Day, Ross Pony Mixers; 8 and 15 gal.
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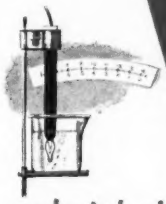

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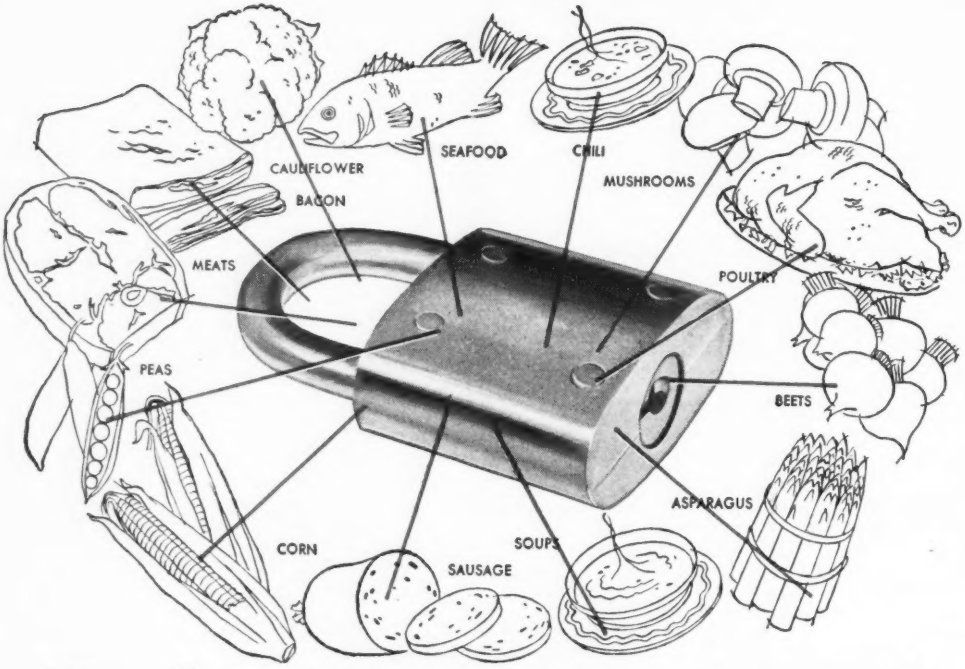

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The number after each item in the list is the number of the page it appears on. Where more than one item is described on a page, prefix capital letters indicate position: L,R,T,B,C (left, right, top, bottom, center). Small letters are used to separate several products described in an advertisement. Capital letters following page numbers identify products and literature described in monthly editorial departments.

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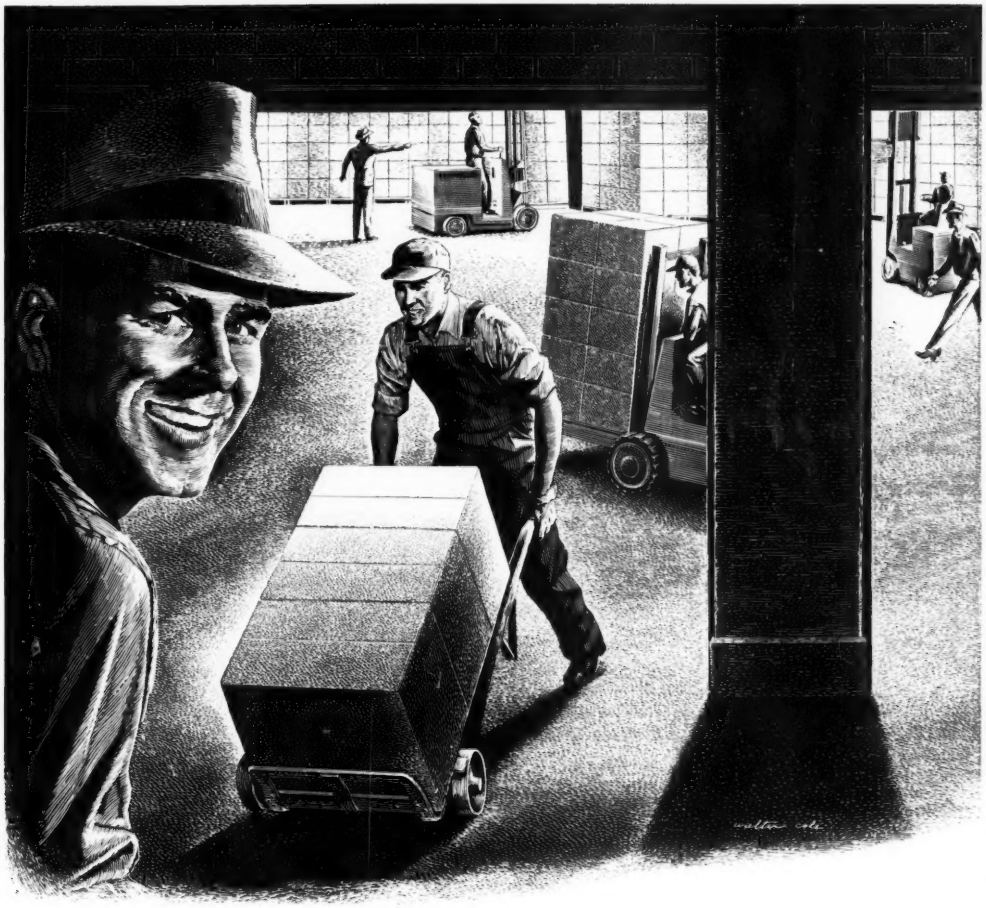

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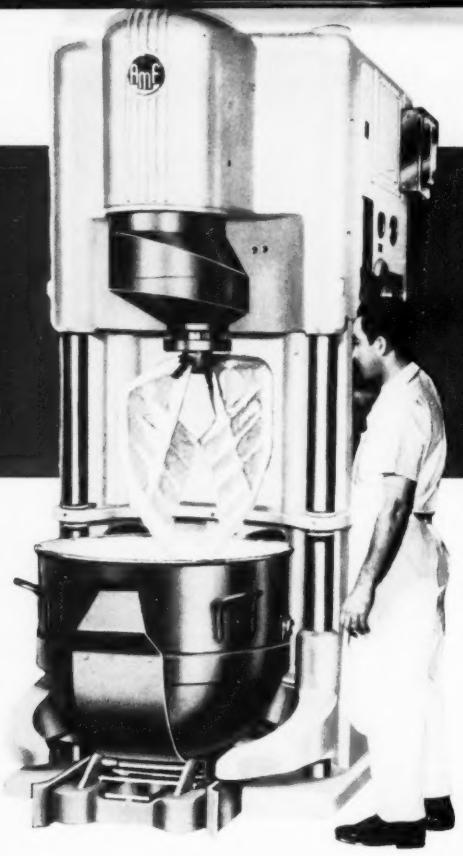

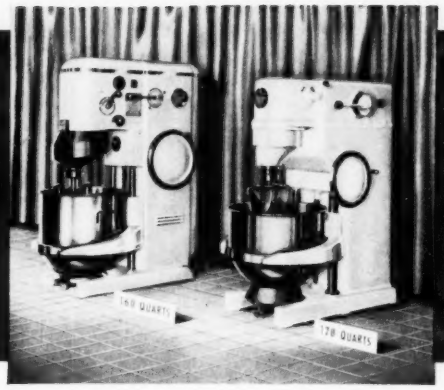

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